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Precision SHOOTING

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WILLOWS RIFLE CLUB (CALIFORNIA)
COMFORTABLE LOUNGING ROOM

THIS MONTH

EXPERIMENTS WITH 6.5 SWIFT AND OTHER CASES—Gerald B. Southard

THE .300/.378 WEATHERBY—D. C. Reilly

JUMP, VIBRATION AND BARREL WEIGHT
Col. Townsend Whelen

a magazine for Shooters by Shooters

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POSSIBLY MISLEADING

There are some comments in the STOOL SHOOTIN' STUFF column in this issue with which I do not agree and which I believe could be quite misleading to some people who are not familiar with competitive bench rest shooting and the rifles and equipment commonly used.

Bench rest shooting from its beginning has been noted for the "unusual" weapons that have been brought to matches and fired in competition. Some have had very little resemblance to what most of us consider a rifle should look like. To say that some of those "unusual" weapons would be inconvenient to use for practical field shooting I quite agree with, and consider the term "inconvenient" a gross understatement.

The statement that a person might win a national championship for bench rest shooting with unrestricted rifles and later take that same rifle used for winning the championship and, resting on a fence post, kill a crow at 200 yards range is not an impossibility, but I would consider it normally rather improbable.

The so-called "unrestricted" bench rest rifle is a specialized weapon, specifically designed for shooting from rests, and with the purpose of trying to shoot five or ten shot groups small enough to win in competition. The rifles most commonly used for bench rest competition have barrels 28 to 30 inches long and 1¼ inches or more in diameter the full length of that barrel, with massive stocks with very wide, flat-bottomed forearms. An average weight for these rifles would be at least 20 pounds, and some will run to 30 or even 40 pounds. The rifle I used for competition last year (one of the more "conventional" types) weighs 19 pounds without scope, has a forearm over 4 inches wide with a flat bottom of nearly 3 inches, and a grip at small of stock which is really a handful. It would require a lot of fanciful imagination to call one of these rifles "convenient" to use as a varmint hunting rifle. Further, if one did rest one of these rifles on a fence post to shoot at a crow 200 yards away, it would be as a last resort and because that person could find no better rest from which to see the crow; and a rest would most certainly be needed to shoot such a rifle from.

I respect the right for everyone to have his own opinions and viewpoints, and to try to promote his views if he wishes, but I do not believe one should allow his imagination too much leeway in so doing.

It is probable that some people do drop out of participation in any shooting program because they do not like the rules and regulations. Others drop out because of many other personal reasons, and distaste for constant argument and bickering among competitors might not be the least of such reasons.

For those people who wish to participate in competitive rest shooting with weapons which may also be "conveniently" used for hunting, the National Bench Rest Shooters Association provides competitive programs for both heavy and light Varmint rifles and for Sporter rifles of medium big game hunting type. From such information as this writer has, it is his opinion that these Varmint and Sporter class programs for competitive rest shooting have the best chance of growing by attracting a sizable number of competitors. Those programs are comparatively new and there seems to be a growing interest in them.

PHT

Winning team in Anchorage, Alaska, Rifle League, the Elmendorf Rod and Gun Club. Left to right are Russ Kroboth, Noel Woods, Perley Jones and Jim Lawton.

ALASKA SHOOTING

A seven team MIDNITE SUN INDOOR RIFLE LEAGUE in the Anchorage, Alaska, area finished its schedule in February with the Elmendorf Rod and Gun Club team going through the season without losing a match to win the league championship. High individual averages for the 10 shots in each prone, kneeling and standing course were: Noel Woods 288, Perley Jones 285, Russ Kroboth 283, all on the Elmendorf team; Clifford Mann, Bull Shooters, 275; and John Ireland, Ike Walton Rebels, 274. Ann Kroboth of Elmendorf had 271 for High Lady average.

At the end of the league season, on February 28, a handicap match (using the Western Drop-Point table) was held on the Elmendorf 10 point range.

The MIDNITE SUN INTERNATIONAL LEAGUE will operate for its fourth season with all matches fired in June and July. This is a postal league for free rifle with any sights and fired at 200 yard range on the reduced 300 meter target. Course of fire is 20 shots in each prone, kneeling and standing positions. Entries are limited to 100. Information can be obtained from J. Scott Donaldson, Box 525, Anchorage, Alaska.

Scott Donaldson writes of the outdoor range facilities of the Ike Walton Club at Anchorage as follows:

"The range is situated about 17 miles from Anchorage along an arm of Cook Inlet. It is uniquely situated because travel to it can be by boat, Alaska Railroad (get off at Birchwood ¼ mile from range headquarters), highway, dog-team, airplane, or mushing. An airstrip suitable for multi-engine planes is adjacent to the range. It is a gravel runway that was a satelite field during the war and now a number of small planes are based on it; their owners living in the Birchwood area.

"Sometime in June the club expects to have a fly-in shoot and barbecue and hope to have riflemen from all over this part of Alaska.

"We have a big bore range that will be extended this summer to 300 meters, a small bore range, pistol range and a little farther over is a bench rest range. At present there are only two concrete top benches. By selling bonds, due in one to three years and drawing 5% interest, it is expected to raise enough money to cover 5 benches, install target carriers on the big bore range, and a covered firing line on the pistol and small bore ranges.

"If you bench shooters are planning a vacation trip to Alaska this summer it is strongly suggested that we be contacted and we sure will arrange a shoot. The range, up to 200 yards, is nicely situated with very little wind. When you sit down and line up on the 200 yard target, Mt. McKinley should be in your scope field of view, some miles to the north. And we can guarantee that unless you are overcome by the majesty of North America's highest mountain, this Alaska air will inspire you and your gun to shoot the smallest groups in many a moon."

YOU ARE INVITED to take part in the discussions in Precision SHOOTING. The more reports we have on the various angles of shooting and gun behavior, the sounder conclusions we may be able to draw. Discussion of any type of rifle or handgun will be of interest to some readers.

Top shooters in Anchorage, Alaska, Handicap Championship Match. Left to right are Cal Barker, 1st; Bob Clark, 2nd; Bud Ertwine, 3rd; Dave Drew, 5th; and the League Manager, Scott Donaldson.

EXPERIMENTS WITH 6.5 SWIFT AND OTHER CASES

By Gerald B. Southard

I first became interested in the 6.5m/m caliber when J. W. Van Patten, Gunsmith, Milford, Penna., and I were discussing what would make a good long range chuck rifle. One that would buck wind and shoot bullets that were suitable for killing chucks at long range. Mr. Van Patten had a few 6.5-06's out and the letters he received were very encouraging. Accuracy looked first rate too from some of them.

I decided to rebarrel my 721 Remington with a medium weight barrel, 6.5-06 cal., .750 muzzle diameter, 24" long, 10" twist. I used the factory stock and opened up the forearm to take the slightly heavier barrel. Here are a few loads which turned in some groups below minute-of-angle accuracy and some of these were able to shoot frequent ½" groups:

56 grs. 4350— 77 gr. Norma bullet
55 grs. 4350— 87 gr. Speer bullet
54 grs. 4350—100 gr. Hornady bullet
53 grs. 4350—120 gr. Sierra bullet
52.5 grs. 4350—140 gr. Norma bullet
All with #8½ Western primer

This Douglas barrel was ordered with .264 bore diameter, but it shot bullets of .263 diameter just as well.

I next decided to build a bench rifle using a heavy Douglas blank, .264 diameter, with Remington 721 action and bench rest type stock. I had J. W. Van Patten fit and chamber it for the 6.5-06 again. Figuring this barrel to be even better; I was surprised to see that the groups were about the same. I did occasionally get a few 0.3" and 0.4" groups. I fired this rifle at the National Bench Rest Matches at Johnstown last year. It was reported on in the November issue of Precision Shooting. This barrel seemed to favor the heavier bullets, and shooting the 140 gr. Speer best. The 140 gr. Norma boat tail was good, but I would get flyers occasionally that would wreck a swell aggregate. The 140 gr. Sierra was as good, but I couldn't keep those boat tails averaging as good as the flat base.

On August 9th, Emory Tooly, Dolgeville, N. Y., was visiting me, and he thought he would like to try this gun out. He fired 40 shots that day in five shot groups. Here are the loads, all with #8½ Western primers, and the group sizes he made:

58	grs. 4831—120 Speer	.637"
58	grs. 4831—120 Speer	.977"
58	grs. 4831—120 Speer	.987"
57.5	grs. 4831—120 Sierra	.687"
57.5	grs. 4831—120 Sierra	.767"
57.5	grs. 4831—120 Sierra	1.037"
52.5	grs. 4831—140 Speer	.657"
52.5	grs. 4381—140 Speer	.657"

Average .8007"

After the matches at Johnstown I felt perhaps a smaller case might tighten things up a bit. I had Van Patten rechamber this to the 6.5 X .257. By this time there was around 1300 rounds through this Douglas barrel. He cut off 3" and we had a good throat again. There was less recoil with the smaller case, but I saw no improvement in grouping. I would average about 0.8" when things were favorable.

For a long time I have wanted a Van Patten rebored barrel, but couldn't figure what to have it made to. I had a Winchester Target Grade .220 Swift barrel with 2200 rounds through it, and it was shot out. I decided to rebore this to 6.5m/m and neck up the Swift case. This we did, and I put a heavy thumbhole stock on the Model 70 action; which made a fair bench rifle, although pretty light in the barrel I thought. On December 25th the weather was perfect for testing, and I fired during that day 50 shots, averaging .793". My load was 44 grs. 4350, 87 gr. Speer bullets and #9½ Remington primers. On December 27th I fired 45 shots using a load of 43 grs. 4350 and the Hornady 100 gr. bullet and Remington #9½ primers for an average of .867". The 77 gr. Norma is a nice shooting bullet, but did not run any long string of shots for a test on average accuracy. The 6.5 Swift appears very flat shooting and plenty fast. I wouldn't hesitate to use this for chuck shooting one bit, and feel it would be superior to many existing cartridges. I tried various powders such as 4198, Ball C, H-380, 3031, 4831, 4895, 4064, but concluded that 4350 gave best speed and accuracy. This seems to be true of all the other cases I have used in my 6.5m/m testing. I considered 4064 and H-380 to be alike, and next best in performance. The barrel had a 12" twist and would not stabilize 120 gr. bullets. The 77 gr., 87 gr. and 100 gr. worked excellently in it. Case life was much better than in the regular Swift as the necks were thinned by opening up. I used 25 cases to fire 600 rounds with no loss. This was a poor lot of brass when I used them in my .220 Swift; the cases often splitting after 5 firings even though annealed. I annealed them after forming to 6.5m/m just before firing. Here seemed to be a nice combination, but it still didn't answer my question on recoil. Would it be better in a heavier barrel?

I had a heavy Douglas blank lying around so Van Patten fitted this on a 722 action and chambered it for the 6.5x220 Swift. This gun averaged about the same as the rebore job. My conclusion was that recoil didn't affect accuracy in this particular caliber. I then had the rebored barrel chambered for the '06 case. It is averaging around 0.7" with 87 gr. Speer bullets. The 12" twist does give slightly improved accuracy with light bullets, but I feel the 10" twist as good, and better for the big 140, 155 and 160 gr. bullets when fired from large capacity cases. I did not try the Magnum case shortened because the '06 case was overbore capacity, but not as bad as some wildcats. The rebored barrels have much to commend them. There is a bit of skill involved in this, and Van Patten has certainly demonstrated that he knows what it is all about.

I have one more 6.5 m/m that should be along any time now. It's on the 257 Roberts Improved case. I think I can about duplicate '06 performance with the lighter bulelts, and I'm anxious to see what the improved shape will do with 4350 powder. None of the cases I have used so far have had the sharp shoulder.

In conclusion, I feel the '06 case is about the best to date for the all around rifle in this caliber. With bullets ranging in weight from 77, 87, 100, 120, 129, 140, 155 and 160 grs. one can readily find a bullet to fit the type of game he will hunt with it. The new Nosler bullets are the ultimate for this type of rifle for big game. I have made easier shots and cleaner kills on chucks with the 6.5-'06 than with any rifle I have used in 30 years hunting experience. My furthest shots have been out to 400 measured yards. It definitely bucks wind better, and seems to be flatter shooting than anything I have tried over this period of time.

THE .300/.378 WEATHERBY

By Dermot C. Reilly

An interesting new cartridge of spectacular ballistics made by necking the .378 Weatherby to .300 has been developed by Weatherby for the Government.

The outside dimensions of the single case (polished and loaded as a dummy cartridge) which has come into this writer's possession are as follows:

Overall length, 2.907"

Head to front of belt, .246"

Diameter of head below extractor groove, .578"

Diameter of head at belt, .605"

Diameter of body immediately ahead of belt, .587"

Diameter of body at point of tangency with small shoulder radius (2.380" from head), .561"

(Continued on Page Four)

The .300/.378 Weatherby

(Continued from Page Three)

Length of neck from point of tangency with shoulder radius to mouth, .315"

Eccentricity of neck, .002"

The profile of the shoulder is an ogee curve with the convex radius between the body and shoulder being about half the concave radius between the shoulder and neck.

As is apparent from the aforesaid dimensions, this cartridge dwarfs the .30 Newton and all .300 Magnums developed from the .300 H & H or .375 H & H case.

The loading data with muzzle velocities from a 26" barrel, estimated pressures and muzzle energies (computed with g equal 32.16) given by Weatherby are as follows:

Charge	Powder	Bullet	Muzzle velocity in 26" barrel	Pressure Estimated	Muzzle Energy
104 grs	4350	110 gr	4115	52,000 psi	4142 ft. lbs.
106 grs	4350	110 gr	4235	54,000 psi	4381 ft. lbs.
108 grs	4350	110 gr	4340	Maximum	4601 ft. lbs.
98 grs	4350	150 gr	3660	52,000 psi	4463 ft. lbs.
100 grs	4350	150 gr	3780	54,000 psi	4760 ft. lbs.
102 grs	4350	150 gr	3900	Maximum	5067 ft. lbs.
94 grs	4350	180 gr	3495	52,000 psi	4874 ft. lbs.
96 grs	4350	180 gr	3550	54,000 psi	5029 ft. lbs.
98 grs	4350	180 gr	3605	Maximum	5191 ft. lbs.
86 grs	4350	220 gr	3140	50,000 psi	4807 ft. lbs.
88 grs	4350	220 gr	3200	53,000 psi	4992 ft. lbs.
90 grs	4350	220 gr	3250	Maximum	5150 ft. lbs.

A target shooter is immediately struck by the thought that, due to the fact that the maximum loads listed with the heavier bullets obviously do not fill the case, a slower powder would obviate the necessity for uniformly positioning the charge prior to firing each shot and would likely permit increased velocities without increasing pressures. Impressive as the velocities shown for the 180 gr. and 220 gr. bullets are, it is apparent that #4350 is not the ideal propellent for such projectiles in this cartridge. Whether or not **available** slower powders would effect an improvement is a matter of conjecture.

When compared with the .300 H & H, or even the hottest .30 calibre cartridges developed from said case, the velocity advantage of the new cartridge is such as to recommend it as a potential 1000 yard record breaker. The 180 grain bullet has been loaded in the .300 H & H to velocities between 3030 f.s. and 3160 f.s. Let us take 3100 f.s., a representative stiff load under the maximum, as a basis of comparison with the new cartridge.

According to the du Pont Exterior Ballistics Charts, a 180 grain bullet with a ballistic coefficient of .58 starting at 3100 f.s. would require 27 minutes of elevation to reach 1000 yards. A round 2 per cent under velocity would require 28 minutes; i.e. it would strike 10.47 inches low, enough to miss the V-ring, all other factors being perfect. The same bullet loaded to 3550 f.s., (the velocity of the intermediate load given by Weatherby for the .300/.378) would require 20 minutes to reach 1000 yards, and if it were 2 per cent under velocity it would required about 20¾ minutes, still a V, all other factors being perfect. In short, the accuracy of the new cartridge at 1000 yards is, within the significant limits of error, about 25 per cent less sensitive that that of the .300 H & H to percentage velocity variations.

The charts indicate a wind drift from a 3 or 9 o'clock 10 m.p.h. wind to be 5 minutes at 1000 yards for the new cartridge and 6 minutes for the .300 H & H, both loaded as assumed above.

Sierra has, at the behest of the Army Advanced Marksmanship Unit, developed a new full jacket spitzer point 200 grain boat tail match bullet. It is about 1.4 inches in length and appears to have an ogive of 8 calibres in radius (longer and sharper than the present 200 grain "Match King"). Its ballistic coefficient appears to be about .62. Whether or not it will be marketed is problematical. It is superbly accurate but required a 10 inch or faster twist in the .300 H & H and apparently cannot be stabilized at long range in the .30-06 with a 10 inch twist. In an improved or blown out .300 H & H Magnum it seems ideal, and should work well in the new .300/.378. Since the 180 grain and 220 grain bullets can be loaded under maximum pressure in the .300-.378 to give almost exactly 5000 foot pounds of muzzle energy, the 200 grain bullet can be loaded to the same energy, still keeping within permissible pressure limits. Solving the equation:

200 (V squared) divided by (64.32 X 7000) equals 5000 gives the velocity of this bullet loaded to said muzzle energy as 3355 f.s. Referring to the du Pont charts again, the elevation required by is plotted as 21 minutes. A bullet under velocity by 2 per cent would strike said bullet so loaded to reach 1000 yards slightly more than three quarters of a minute low. The wind drift at 1000 yards caused by a 10 m.p.h. wind at 3 or 9 o'clock is plotted as slightly more than four and one half minutes.

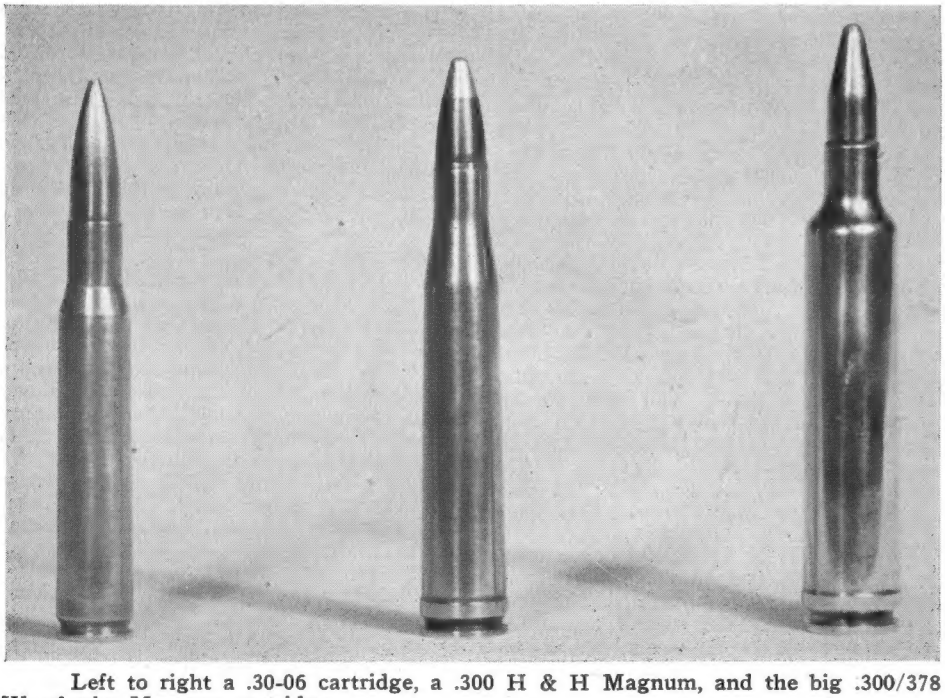
The shoulder shape selected will not and of course could not meet with universal approval. Shoulder shape designs in general seem to be governed by three considerations: (a) The theory propounded by N. H. Roberts and others about 30 years ago that a smooth-funnelling gradually tapered shoulder was conducive to superior accuracy; (b) the theory propounded by O'Neil, Keith and Hopkins about 20 years ago that an abruptly tapered shoulder tended to burn a greater percentage of the charge in the case and therefore extended the life of the bore, and (c) tractable behavior of the case in the dies. Weatherby's design will satisfy those weighting "a" and "c" heaviest.

The question as to eccentricity is impossible to resolve from the examination of one case. The .002" eccentricity is better than average for large cases as drawn. It seems that bullets with long bearings tend to **partially** straighten themselves in spite of considerable eccentricity. However, if the testing by free lance individual varminters and bench resters has proved anything, it is that, next to good bullets, the most important attribute of any component is neck concentricity. For serious competitive shooting it would be worthwhile to machine the necks concentric and to uniform thickness.

The question, "Will the added recoil of the new cartridge offset its ballistic advantage as a long range target cartridge?" presents itself. This one can be resolved with mathematical certainty by comparison of Weatherby's intermediate 180 grain load with two known standards, one ancient, one modern.

First, the old one: The .45-120-550 Sharps with 1600 f.s. muzzle velocity was used successfully for long range competition even after the Krags got around. Assuming rifles of the same weight and making use of the familiar law of mechanics; MV equals M prime V prime and using the commonly accepted approximation that, for recoil calculation, half the weight of the charge may be regarded as projectile, we come up with the equation: 1600 (550 plus 60) equals 3550 (180 plus 48) K, where K is the ratio of recoil velocity of the Sharps to that of the new Weatherby loaded as assumed. Solving the equation we get K equals 1.205, i.e. the Sharps came back 20.5 per cent faster. The odds are that the young rifleman who lies down behind a .3300/378 bull gun is bigger and stronger than (if not quite as tough as) his grandpop or great-grandpop who put them in with a Buffalo Sharps.

Now consider the modern standard. A lot of girls (not Amazons, just nice



Left to right a .30-06 cartridge, a .300 H & H Magnum, and the big .300/378 Weatherby Magnum cartridge.

girl-sized, girl-shaped girls) have made their men-folks sit up and take notice with their performances with the '03 and M-1. Referring to the same principal of mechanics and the same approximation, and taking the weight of a Service rifle as 9.2 lbs. and a 180 grain bullet driven at 2750 f.s. by 58 grains of powder as a standard long range .30-06 load, we come up with:

2750 (180 plus 29) W equals 3550 (180 plus 48) 9.2, where W equals the weight of a Weatherby .330/.378 loaded as assumed with the same speed as the Service rifle loaded as assumed. Solving the equation we get W equal to 13 lbs. Falling back again on the above stated physical principal we see that if the girl weighs 12½ times as much as the Service rifle (115 lbs.) she will be driven back at exactly the same speed as her brother behind the .330/.378 providing he weighs 12½ times as much as the rifle he is shooting; i.e. 165 lbs., about average for a young fellow nowadays. The kick won't hurt him and shouldn't worry him.

The case is still a wildcat. Weatherby says "we do not have any plans for bringing this on the market" but they will furnish .378 cases at $8.00 per box of 20 and could build in rifle, including the loading die, for $375.00. Presumably the rifle would be a bull gun on the new Mk V action since the information above was elicited by a letter containing an observation that the new cartridge might have Wimbledon possibilities and Weatherby presently recommends only the Mk V action for the .378 Weatherby.

Conclusions: Based on the foregoing and assuming the du Pont charts to be approximately correct, it seems that the following opinions are logical conclusions:

1) The .300/.378 properly loaded should be one of the very best long range target cartridges yet developed, particularly so if the case necks are machined concentric and to a uniform thickness.

2) A shooter does not have to be a Sir Samuel Baker to shoot long strings with a rifle in bull gun weight chambered for the .33/.378 without discomfort.

OBSERVATIONS ON THE S & W KIT GUN

By Alfred L. Triggs

Several persons in this area (Melvern, Kansas) have owned the little Smith & Wesson Kit Gun with the stubby 2 inch barrel for some time. I believe they uniformly agree that this gun makes an ideal sidearm to carry along when you are hunting with your varmint rifle or shotgun. The amount of small game we get and the number of wild housecats we sneak up on and destroy is far more than anyone not familiar with the use of the little gun might imagine.

The little gun is conveniently carried and is surprisingly accurate. When we can legally do so, most of us carry the little gun in our shirt pocket, but of course it can be carried like any other pistol or revolver, only it occupies much less space. When you carry the gun in your shirt pocket there are no keys or coins to scratch the gun, and unless perspiration is excessive, consistent use of RIG seems to protect the gun adequately.

As to accuracy, it is my own observation that if you shoot about 80 on the 50 foot gallery slow fire target you should find yourself getting just about the same number of shots in the black as you would with your target pistol or revolver. You will have a few less tens and when the shots go out into the white they generally go considerably further out than they would with the target gun. Shots in the black should generally hit game at reasonable distances and shots in the white generally miss. So on the whole, with a very compact gun you can come out about the same as far as game is concerned as you can with a far larger and heavier gun in the same calibre. No gun can be too accurate, but when we must consider convenience as well as accuracy, I would consider this gun adequate for the type of hunting generally done with it.

If you happen to be one of those persons who consistently shoot slow fire scores in the 90's, then you will find the extremely short sighting radius and other limitations of the Kit Gun a definite handicap. However, you will probably find the Kit Gun such a pleasant and efficient tool to have along that it is unlikely that any other pistol will quite take its place. If you own both a large .22 calibre pistol and also the Kit Gun I am quite sure you will find yourself leaving the big hunk of iron at home when you are going on hunting trips. Naturally, on the target range it is an entirely different matter. If you are to use the Kit Gun capably you should do some slow fire shooting on the range with it. Because of the grip, lack of weight, etc., the gun is impossible for timed or rapid, so you will probably do better to shoot slow fire only with it.

If you have never shot pistol at all or are a very poor pistol shot, then you would probably be better off with a heavier gun with a normal sized grip in the same calibre. With the Kit Gun the weapon must be held just right, sight alignment must be almost perfect, and unless you have an excellent trigger squeeze you will throw the gun a mile off the target.

If perchance you think that you might compromise and get the Kit Gun with the 4 inch barrel instead of the 2 inch, I believe you would be in for a disappointment. At least, one time when I owned both a .22 cal. Combat Masterpiece and a Kit Gun with the 4 inch barrel I found myself always taking the Combat Masterpiece and leaving the long barreled Kit Gun at home. The Kit Gun with the 4 inch barrel was a little less accurate than the Combat Masterpiece, the grip was much less comfortable, and yet it was just as much trouble to carry. Since I have had my Kit Gun with the 2 inch barrel the Combat Masterpiece has seldom been fired, and I really don't know why I keep it.

If you are to use the little Kit Gun successfully, then grip adapters or special grips are a must. The ideal would be some special grips made up by Herrett but with the grip ending flush with the butt of the gun. Of course you could hold it more certainly if the grips were made the way Herrett usually makes them, but then you would lose some of the other qualities that makes this little gun so desirable—compactness and convenience. Most of the fellows I know are using rubber grip adapters and getting by very nicely, and they are of course much cheaper.

You will have to adapt yourself to the very small grip, and it could be that you might find my own method of grasping the gun helpful. I simply push my thumb further around and move my hand further around the grip so that the side my trigger finger is on is almost in the same place as it would be if I were using a target grip. It is very likely that your little finger will not touch the grip at all. Mine does, but I apply no force with it but grasp the gun quite firmly with the rest of my hand. It is likely that you will find even a better way for yourself.

The gun must be fired with low speed long rifle ammo instead of high speed unless you lower the rear sight by filing or have a gunsmith raise the front sight. Otherwise the gun shoots too high. I think you will probably find it much better to open the rear sight a bit too, as it is simply too "tight" for good visibility under hunting conditions. Personally it is a little easier for me to focus on obth sights because they are so close together when light conditions are poor. You may or may not find the same condition true for you.

The Smith & Wesson Kit Gun is beautifully made, as are all Smith & Wessons, and if anything they seem to have improved the quality of workmanship recently, instead of getting poorer and poorer in quality as many American guns have. For one thing, the side plate fits so snugly in its recess that you almost have to look twice to see where the two pieces join, whereas on most guns you can almost drop a nickel into the gap. The guns I have examined recently have had uniformly good trigger pulls—something that Smith & Wesson were a bit careless about for a while.

Look one of these little guns over the next time you are in a store. I think you will really fall in love with it.

THE TOURNAMENT CIRCUIT MID-WINTER RIFLE SHOOTING IN FLORIDA

Frank J. Kahrs

For twenty-four years there has been almost a week of Championship Rifle Competition in St. Petersburg along about the first week in March (8th to 11th this year). These competitions are registered by the N. R. A. and are sponsored by the Florida Small Bore Association and the Sunshine Rifle and Pistol Club with the cooperation of the St. Petersburg Chamber of Commerce. All of this, mind you, is under the supervision of one man, Neil Cocking, who took over where "Mike" Franklin Bridgeland left off a long time ago. It was "Mike" who originated the Mid-Winter. I know because I was at the first one.

Had Neil Cocking set the date of the matches one week later there would have been no matches—they would have been rained out. During the last two hours of the matches on Friday, it started to rain, and I mean rain, and it was still raining a week later as this is written. It was a full week of Championship Caliber Shooting with an even 150 top flight shooters from 23 states as follows: Texas, Pa., Ohio, W. Va., Mo., N. C., N. Y., Md., N. J., La., Colo., Va., Ga., Mich., Ill., Ind., Ky., Okla., Iowa, Ala., Conn., Mass. and Wisc.

Nearly 100 men from the armed services battled it out with each other while 50 civilians challenged the best the Services could give. It was a civilian, Robert B. Kennerly, Asheville, N. C., a sort of a dark horse who romped in with a total of 3189-241 to win the big match of the shoot, the Grand Aggregate, with which goes the honor of being the National Mid-Winter Small Bore Champion. It was a narrow squeak for Kennerly, however, because Lt. John T. Bertva of Lackland Air Force Base, Texas, was right on his heels with the same total but a bit shy on X's, he having only 204 to

(Continued on Page Six)

The Tournament Circuit

(Continued from Page Five)

241 for Kennerly. The third place winner was H. F. Frietchen, Mansfield, Ohio; fourth, W. D. De La Mater, Parkersburg, W. Va.; fifth, Sgt. E. E. Caygle, Jr., Lackland AFB. Herb Hollister, last year's winner, put up a hard fight to retain the championship but fell five points short in sixth place.

Next in importance is the South Eastern Small Bore Championship, an aggregate of four matches. It was another tight race to the finish with Sgt. Caygle demonstrating conclusively that it is points that pay off, as he won by one point over De La Mater, who had more X's. The scores—Caygle 1595-101; De La Mater 1594-108; Lt. Bertva 1594-92; Lt. Kendall 1593-118; H. F. Frietchen 1593-115.

Young Janet Friddell of Toledo, Ohio, sprung a surprise by winning the DeWar Aggregate with a clean 800 and 58 X's. This little lass demonstrated clearly that "The female of the species is more deadly than the male." Lt. Presley Kendall of Ft. Benning, Ga., always a threat, was the runner-up with a 799-67, another case where another point would have taken the match. Fred Triggs of Chatham, N. J. was third with 799-58, Herb Hollister fourth with 799-56, and Robert Kennerly fifth with 798-62.

Still another important match to win is the U. S. Service Trophy Match, also an aggregate of four matches. Robert Kennerly got there "firstest with the mostest" for another gold medal to place in his collection. His score, 1597-127; second, Al Freeland, the Rock Island, Ill. shooting accessory tycoon, 1596-106; third, R. R. W. Dickens, Lackland AFB, 1596-102; fourth, Lt. Bertva, 1595-112; fifth, Lt. M. Friend, Ft. Benning, Ga.

The armed services were represented by teams from the USA, USAF and USMC and the area bounded by a Texas to Colo. to Maryland line.

There were many other winners but lack of space prevents giving these in detail. Also, there were plenty of medals for those who won in their classifications and special medals for the service men. Yes, sir, it was a darn good shoot and as usual Charlie Hubbard, Chief Range Officer, a veteran of the Coast Guard shooters, now in retirement, did his usual bang-up job of keeping the firing line going.

WESTERN WILDCATS SMALLBORE TOURNAMENT

The second Annual Mid-Winter Smallbore Tournament of the Western Wildcats Rifle Club was held in Phoenix, Arizona, on Feb. 27-28. Once again it furnished the same close competition to the last shot as did last year's tournament. When the final tabulation was finished, James Hill of the San Diego Marine Corps Base had nosed out Joe Specht of Fresno, Calif., 3191-228x to 3190-228x.

Following Specht to make up the "Top Ten" in the grand aggregate were: William Grater, 3189-230; V. D. Mitchell, 3188-219; Robert Boydston, 3187-238; George Stidworthy, 3187-230; Charles Ainscoe, 3186-216; Forrest Kline, 3185-220; Frank Briggs, 3184-226; and Clarence Cope, 3184-223. Bill Littrell was the Hi-Expert in the Grand with 3175-187 and Clifford Gilliam was high for Sharpshooter-Marksman class with 3175-178, 16 points ahead of his nearest rival.

Shooters travelled to Phoenix from 11 Western states. Contributing to its popularity are the fine competition, its social aspects and a fine award schedule.

Ukiah Rifle Team, champions at the Willows, California, Sectional Gallery Rifle Tournament. Standing, left to right; Ken Cummins and Rod Palmer; Sitting, left to right; Irvin Brown and Bob Wood. Cummins was the individual champion, Brown 2nd, Wood 3rd and Palmer 11th.

There was a total of 142 entries submitted, but range facilities made it necessary to limit them to 106.

At the end of the iron sight shooting on Saturday, Hill and Specht were tied on point score, both 5 points down, but Specht led in X-count, 112 to 101, to win the iron sight aggregate and the Redfield award. George Stidworthy of Prescott, Arizona was third with 1593-108.

Hill gained his one point lead in the second any sight match, at 50 meters, and held it for the final two matches, as well as gaining X's. Hill won only one of the eight fired matches, the 50 meter iron, and Specht did not win a fired match.

Harvey Mutch of Enterprise, Oregon, won the first two any sight matches, 50 yard and 50 meter, but Bill Grater of Oxnard, Calif., beat him out in the any sight aggregate, 1598-129 to 1597-121. Watt Redfield, the Wildcat's retiring president, was third with 1597-120.

WILLOWS, CALIFORNIA, RIFLE SECTIONAL

At the NRA Gallery Rifle Sectional Tournament at Willows, California, February 27-28, last year's winning civilian shooter, Ken Cummins of Sebastopol, Calif., bettered his score this year to a winning 793. Cummins, who was in definite trouble his first five shots offhand, did a tremendous job in holding on to score a winning 194 in the off-hand match. He also won the kneeling match with the top ranking of five 199 scores. He tied Al Parker's winning 200-19x score in the sitting match but was Creedmored to runner-up spot.

In the team match it was the Ukiah Rifle Team of Cummins (394), Robert Wood (393), Rodney Palmer (391) and Irvin Brown (391) for team total of 1569, twelve points up on runner-up Santa Rosa.

Following Cummins in the grand aggregate were: Irvin Brown 791, Robert Wood 789, Gregg Paillex 785, Duane Jenner 784, Howard Forster 782, John Anderson (high Service) 782, Byron Davis 781, Victor Zimin 780 and Clifford Block 780.

The Willows Rifle Club, again as at their Northern California Gallery Rifle Championship, weighed all triggers. Practically everyone of the 96 shooters was decidedly in favor of weighing triggers. Some of the unsolicited advice offered to a man whose trigger won't quite scale is priceless. "Weighing in" grew to be an event all its own.

It is our opinion here (Willows) that any National Record fired should be certified by the Official Referee as to the legality of the firer's equipment, trigger and firing position.

The outstanding Match winner was the expert shooter that cleaned the field in the sitting match, Al Parker of Ukiah with 200-19x.

THE WORLD'S LARGEST

The Connecticut Rifle and Revolver Association claim of conducting "the world's largest gallery rifle tournament" was again supported by their total entry of nearly 1500 competitors in their 29th annual State Gallery Match on the Winchester Arms Company rifle ranges in New Haven, March 11-12-13, 1960. There were 126 senior teams of four plus 44 individuals not on teams; 149 junior teams of four plus 44 individuals not on teams; and 70 sub-junior teams plus 25 individuals. A comparatively few of the better young shooters fired on teams in both the Junior and Senior divisions.

A Torrington Rifle Club team of Walter Horvay (196), Gilbert Graziani (198), Donald Bush (190) and John Bendoraitis (195) won the team match with

their 779 for the 5 shots in each of four positions course. Only one point behind with 778 was the Cos Cob Rifle Club team of Joe V. Hemphill (196), Sam Burkhalter (196), R. Carroll (195) and Arthur Pimm (191). The Manhasset Musketeers, match winners in the previous two years, were third with 773, beating the City College of New York team's 773 by a four point higher offhand score. The G. E. A. A. team from Schenectady, N. Y. beat the Quinnipiac Rifle Club team of New Haven for fifth place by a single point better offhand score for a 771 tie.

Robert Helgans of the City College of N. Y. team matched Graziani's score of 198, both dropping their two points in the offhand position, but Robert McCormick of the Lufbrey Rifle Club team took the high individual honors with another 198 and a 49 offhand, dropping his other point in the kneeling position.

The Dumont Junior Rifle Club won the Junior match over the 10 prone and 10 offhand course with 748. New London High were runners-up and high Conn. team with 734, beating the Middletown High team's 734 score by 5 points in the offhand position. John Delack of Scarsdale High (N. Y.) was high individual with 193.

A JUNIOR SECTIONAL TOURNAMENT

The annual Junior Sectional 4 position gallery rifle tournament sponsored by the Christian Brothers' Academy of Albany, N. Y. was fired on March 19th and 20th on the Academy's 12 point range by 15 teams and 91 individual entrants. The shoot, which was registered, consisted of an individual match of ten shots in each of the four positions and a four-man team match (each team member's score to count) over the same course of fire, all with iron sights.

Relays were scheduled an hour apart and no difficulty was experienced in keeping on schedule.

The Lander Jr. Rifle Club from Boston, Mass. won the team match with a 1508 score. Next ranking teams were American Legion Jr. Rifle Club of Schenectady, N. Y., 1455; LaSalle Institute Rifle Club, Troy, N. Y., 1454; and Christian Brothers' Academy, 1452.

Robert Clark of the Lander Jr. R. C. team, who fired a 387 in the team match, was high in the individual competition with a 383. Russell Bessette, Christian Brothers' Academy, was high R. O. T. C. with 378, and Patti Ann Robertson, Schenectady, was high girl with 355.

Comment: The most frequently observed rifles were Remington 513T's with a liberal sprinkling of Winchester 52's, 75's, Mossbergs and Mausers.

This was a very smoothly run tournament which provided fun for the competitors and gave satisfaction to the sponsor. Shooters who knew they were hopelessly outclassed had no reluctance to compete on an equal basis with more experienced and better equipped riflemen. It is believed that the field was larger than that of any tournament, indoor or outdoor, junior or open, fired in the Capitol District (Albany, N. Y.) since prior to World War II. This, together with the fact that average attendance at registered outdoor open tournaments has fallen by 60% in the area, seems to indicate that the rigid NRA regulations as to classification in registered open tournaments are long overdue for drastic revision.

Conversation with team coaches indicated that most of the boys and girls shot much below their average, proving the adage that there is no substitute for shooting in matches to develop match shooters.

The conclusion is that there is no shortage of skillful and enthusiastic young shooters. If open smallbore competition is falling into the doldrums, it's not the fault of the kids.

D. C. Reilly

ARMY PISTOL SHOOTERS SWEEP FLORIDA MATCHES

Army Advanced Marksmanship Unit pistol shooters from Fort Benning made nearly a clean sweep of Florida pistol tournaments in March.

The first weekend in March, SFC William B. Blankenship, Jr. won the Dixie Pistol Matches grand aggregate at Jacksonville with a 2643 score and established a new national center fire aggregate record of 891. He also won the .22 cal. aggregate with an 881 score. Sgt. Donald Jaynes won the .45 cal. aggregate with an 874. The Army squad won two of the three team matches.

In the Mid-Winter Matches at Tampa the following week the Army shooters won all individual aggregates and all of the team matches. Sgt. Blankenship won the National Mid-Winter Championship with a 2649 score, the .22 agg. with 890, the center fire with 884 and the .45 with 875. Four of the five top grand aggregate places went to AAMU shooters.

At the Flamingo Pistol Tournament at Miami, following the Mid-Winter, Sgt. Donald Jaynes won the individual championship with a 2607, and again four of the five top places went to AAMU shooters. And again Army teams won all the team matches.

JUMP, VIBRATION AND BARREL WEIGHT

by Colonel Townsend Whelen

Memorandum for Phil Teachout and Creighton Audette: Recently you republished Harry Pope's article on barrel jump, and the British findings on the vibration of the very light barrel .303 S.M.L.E. rifle. You also stated that the two of you were about to start an investigation of the behavior of featherweight rifles for the .308 Winchester cartridge. Like Harvey Donaldson, may a very old rifleman be permitted to call the attention of readers of PRECISION SHOOTING to what has been done in the now rather dim past oi these matters.

Of course the younger readers who have grown up since bench rest shooting, that is real precision shooting, started some ten years ago, may be pardoned for not being familiar with older investigations into these matters, and particularly those investigations that I reviewed in my old book "Small Arms Design and Ballistics" published some fifteen years ago. So at the start I would like to quote from Chapter III of Volume II of that work, and very specifically from a letter from Mr. W. E. METFORD, the leading British small arms ballistician of his day. This letter, if you please, was written in 1884, and is here quoted from page 65 of my book.

"When I began scientific rifle work—now, I am sorry to say, over thirty years since—I felt that the proper thing to do would be to rig up a telescope sight, and that it would also be a proper thing to put its optical axis (in which the cross-wires lay) absolutely parallel to the axis of the bore. This I did with all the caution and skill I was master of (I was at that time able to make a theodolite, bar the dividing and the optical glass work). With my telescope set at zero (or parallel with bore axis) I went to shoot at 25 yards, speed 1,400 feet, therefore drop of the bullet at 25 yards a trifle over ½-inch. Telescope was 1 inch above barrel axis, therefore I expected the bullet to strike 1½ inches under the center of spot (rifle not rested). Nothing of the sort happened: the bullet struck a considerable distance under. I at once thought I had made some stupid blunder, and reset the whole work again, but still the rifle did the same * * * The point is, what is the cause?

"My friend William Froude solved it, and showed clearly that it was entirely due to the mass of the stock being unsymetrical with the mass of the barrel and the first thing the barrel would do on explosion would be that the muzzle would flip down, the barrel bending in a curve (this flip down would be dependent for its amount and velocity on the masses, and length, and stiffness, and charge of powder, etc.); and that eventually the whole motion would reverse itself, and the whole gun kick up; but that the bullet would be gone before the barrel had returned to its level and above it, unless the barrel was very stiff and short."

Metford's work was all with what, in these days, would be termed "heavy barrel rifles." Harry Pope's experiments in jump, which you and I both quoted, published some forty years after Metford's, shows that he came to exactly the same conclusion. Metford was of course long before my time, but I knew Harry Pope very well, and often saw him shooting, and all his experience was likewise with heavy barrel target rifles. I never saw him shoot a modern, light barrel high velocity rifle, and I do not believe he ever made such a barrel, bar just a few for the Krag rifle.

Today all the trend is towards featherweight rifles, possibly because in this automotive age we have lost our ability to walk, and also enough of our muscular vigor so that two or three pounds on our shoulder is appreciable. Some fifty-five years ago I made the remark in print that; **"Other things being equal, the heavier the rifle barrel the more accurate will it be."** I had then had probably as much experience as any other rifle shooter, and with all the great amount of shooting I have done since then I see no reason for modifying that statement in any way. However, I note that many of our younger shooters, advocates of the featherweight rifle, are saying that they shoot just as accurately as those with heavy barrels, and they see no reason why they should be burdened with the extra weight.

Since I wrote my book "Small Arms Design and Ballistics" fifteen years ago, Harvey Donaldson inrtoduced to me the bench rest method of shooting the rifle, that is from a bench with two sandbags, which greatly increases the precision of shooting. Since then I have done a rather large amount of what might be termed "precision testing" of a great many rifles of all types, calibers and weights. In fact scarcely a week has gone by in these twelve years, from March to November in each year, that I have not fired at least twenty carefully thought out and as carefully fired test groups from the bench, and I am still shooting at this rate. Quite naturally as a result, I have formed some **opinions** as to the performance of light and heavy rifles in accuracy, dependability, barrel jump and vibration—that is in behavior.

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Jump Vibration And Barrel Weight

(Continued from Page Seven)

First of all it has always been my thought that a normally constructed rifle, as differing from a smooth bore gun, is primarily a weapon to enable us to obtain our food and kill our enemies at a greater distance than is possible with a smooth bore. Such being the case, it also seems to me that it is most important that it deliver its first, second, or third shot with precision so as to hit as precisely as possible where we aim, because no food animal or enemy is going to stand there at a known distance and let us fire ten consecutive shots at it.

As a result of the very large amount of precision testing that I have done in the past twelve years it is still my opinion that the heavy barrel, and indeed the moderate weight barrel is more accurate, and particularly more dependable than the featherweight rifle. I freely admit that a featherweight rifle, with a certain selected and uniform load, will frequently fire a group of five or ten consecutive shots into as small a group as will many heavy or moderate weight rifles. But can it be depended on to deliver its first one, two or three shots to almost exactly the same spot with zero sight adjustment so we can surely hit our food animal or our enemy before they start to move or disappear? Perhaps and perhaps not.

It is my opinion that all normally constructed rifles, irrespective of barrel weight, both jump and vibrate when fired, but that the heavy barrels vibrate less and more uniformly than do the light barrels. With the heavy barrel the jump is quite apparent, but the vibration not nearly so much so. That with the light barrel it is scarcely possible, with any of the facilities we have, to distinguish between jump and vibration. With the heavy barrel the vibrations are slight, so slight that loads of different bullet weight and velocity may group in almost the same spot. With light barrels the vibrations are much more extensive, and also different loads are commonly found to vary considerably in the location of their center of impact. As the barrel vibrates some loads will cause such a vibration that the bullet departs from the muzzle when it is at the top, bottom, or side limit of its vibration, when it is coming to a stop and starting back slowly. Such a load will often group well in a light barrel. But if the load is such that it leaves the muzzle in the middle of its vibration, when the muzzle is moving faster, that load will probably scatter and not shoot as accurately or as desirably.

I must also add that the way the rifle is bedded in its stock has a lot to do with vibration and the way any barrel performs. In the past five years I have had many of my bolt action rifles bedded in glass and the barrel free floated in its forearm from a point forward of an inch or two from the receiver and in every case the accuracy and dependability of these rifles have increased considerably. But I also have a few rifles that have been well bedded by the chisel and with upward pressure of the forearm tip, and these rifles have shot so well that I have never desired to change that bedding, which has always been done by a stocker of considerable reputation. But with every factory bedded rifle, except only one, I have found it highly desirable to have it glass bedded and free floated.

In the course of my recent shooting I have pulled off many tests which seem to bear out all these contentions and opinions. I have here space to detail only a few of them.

I have a .243 caliber Winchester Model 70 Varmint rifle. This rifle has a 26 inch, heavy, stainless steel barrel and weighs about ten pounds without scope. When I received this rifle the bedding in the standard factory stock was such that I thought it best to have the action bedded in glass and the barrel free floated. I have fired it largely with three different weights of bullets, but with various powder charges with each weight. With all of these loads, bench rest at 100 yards, 5-shot groups, groups have **averaged** consistently under a minute of angle, using a 6 power scope. It is the only rifle in caliber larger than .22 which has consistently **averaged** such fine accuracy. The loads are as follows:

100 grain Sierra bullet and either 41 grains of 4350 or 43 grains of 4831 powder.

85 grain Sierra bullet and either 38 grains 4895 or 44 grains 4831 powder.

75 grain Sierra bullet and either 40 grains of 4895 or 39 grains of 3031 powder.

With the scope adjusted so that the 100 grain bullets, both powder charges, center on aim at 100 yards, the two 85 grain bullet loads center ½ inch above aim, and both 75 grain bullet loads center 1¼ inches above aim practically every time. There is also no clear difference in the accuracy of the two powder charges with each bullet weight. This for at least ten groups with each bullet weight and powder charge. Also when shot in the prone position with fairly tight gunsling the location of the center of impact is practically identical with that shot from bench rest.

I also have another rifle, a .257 Roberts Model 70 Standard rifle, a prewar model, that I have shot for many years, that has always been a very accurate rifle with certain loads. This rifle was so well bedded in its factory stock that I have never changed it, and it differs from standard only in having had the screw which fastens the forearm to the barrel removed. The .257 Roberts cartridge is so like the .243 Winchester cartridge in all its characteristics that there should be no difference whatever in the behavior of the two, and with selected loads one should shoot as accurately as the other provided the rifle is the same. But here my .257 has a much lighter barrel than my .243, although not a featherweight. This rifle originally was fitted with a 2½X Lyman Alaskan scope, but now has a 6X Unertl Condor scope in target mounts.

I also have another .257 Roberts rifle with a Neidner heavy barrel, and with this rifle I have records of four slightly different loads, all of which shot in it with practically identical accuracy and location of center of impact with the same adjustment of its 6X Bushnell scope. Therefore this light barreled Model 70 rifle was also shot with these same loads in comparison with the heavy barrel .257 Roberts. Here are the results with the light Model 70 rifle. The day I shot the light Model 70 was an extremely windy one, and the groups suffered, but please note the difference in the vertical location of the centers of impact, all with the same adjustment of the scope.

100 grain Sierra bullet, 44 grains 4350 powder, Western cases, Winchester 120 primer. Overall length 2.95". Five shot groups of 1.45", 1.52", 1.55". Center of impact .50" above aim.

100 grain Sierra, 46 grains 4831, Remington cases, Remington 9½ primer. Overall length 2.95". Five shot groups of 2.00", 1.95" and 1.30". Center of impact 1.5" below aim.

100 grain Hornady Spire bullet, 46 grains 4831, Remington cases, Remington 9½ primers. Overall length 2.95". Five shot groups of 1.2", 1.2" and 2.1". Center of impact 1.6" below aim.

117 grain Sierra B. T. bullet, 44 grains 4831, Remington cases, Remington 9½ primers. Overall length 2.95". Five shot groups of 1.58", 1.80" and 1.17". Center of impact 1.5" below aim.

Our best intentions sometimes go astray. The performance of this light barrel rifle was practically identical with the two heavy barrels, except in the case of the first load above. Nevertheless I do have back at my Vermont home many tests with other light and heavy rifles showing that accuracy averages better with the heavy barrels, and that centers of impact vary much more with the light barrels.

Will someone please conduct similar tests with featherweight rifles, particularly with the .243 Model 70 Featherweight. Unfortunately I do not have such a rifle here to put through its paces. Meantime, as soon as the shooting weather gets better here, I will do some further testing, and will submit to you the results with heavy and standard weight .30 caliber rifles for comparison with similar tests with featherweight .30 caliber rifles which you are going to make.

Please note that all this discussion is more or less academic. Any first class rifle, well assembled and bedded, and with loads suited to it, when sighted in for that load, will shoot plenty well enough for chucks and deer at sensible distances. But of course we are here discussing precision shooting, particularly placing the first three shots precisely on aim.

LETTERS

TRAJECTORY AND WIND DRIFT

Dear Phil:

I have been very interested in ballistics and have read many letters and articles on the subject. Some of these deal with trajectory and some with wind drift. Some are confused with the other and most are in theory instead of based on proven facts.

First, I would like to comment on trajectory, or drop of bullet in its flight. This factor as most know is governed by the law of gravity. In simple words the faster a bullet's flight the more ground it covers. Its trajectory is governed by **flight time** between muzzle and a given point. I might add there is one small factor that could possibly affect the above. With a long bullet and its nose slightly elevated or rather traveling parallel to axis of bore it could tend to float upward with the under pressure as it will drift right or left against this pressure according to right or left twist of the rifling. This is so small we need not concern ourselves. Another factor some will argue is rotational spin created by the pitch of rifling. We cannot count this because we are dealing with flight time from muzzle. One thing that prompted me to write this was a statement by one of our prominent riflemen in effect that: "The 6.5x55 was one of our flattest shooting rifles because with a heavy bullet it shed velocity less in flight than most others. That there was less difference in muzzle velocity at any given distance up to 1000 yards, therefore it was flatter, that this governed drop or trajectory." I don't know what kind of snake medicine he had, but most of us know this cartridge is not too flat and

for "varmint" ranges can be beaten by most of our hot .224's and especially the factory Swift. Possibly he had his long bullet confused with mirage or wind effect. If so he would have a good point. This however is entirely another subject.

Speaking of the effect of wind on a bullet's flight, we have a real set of problems. A number of years ago it was discovered in small bore (22 L. R.) that our high speed ammunition, although very accurate indoors or in a calm, was very sensitive to a little wind. The 22 regular that did not break the sound barrier was more accurate for outdoor match work because it was less affected by wind. It was accepted that a .22 L. R. bullet traveling at supersonic speeds up to 1450 M. V. created a sound wave or sack comparable to a pillow of slightly compressed air in front of it, thus being affected more with the wind tossing said cushion around than a less speedy bullet. About this time a new wind effect theory was applied to higher powered center fire cartridges which contended the bullet that shed more velocity over a given range from muzzle (regardless of flight time) would be more affected. Example: The 220 Swift is the flattest of all factory cartridges up to 300 yards, but probably more affected by wind than any of the heavier bullets of slower center fire cartridges. Along this line a very prominent authority in a leading shooting publication made the statement in effect: "Comparing a .22 L. R., .22 Hornet and 220 Swift for wind drift. The 22 L. R. is slower, sheds less velocity over 100 or 200 yards, or does not lose as much velocity as the Hornet, therefore it is less affected. Likewise the Hornet is less affected than the 220 Swift." This statement will not hold up. Any rifleman who has shot a 22 L. R. at 100 yards in matches knows it don't take too much wind change to get in the white from a previous X ring, a distance of 3½ or 4 inches. The same wind will only affect the Swift by an inch or two at most. I have shot the two on the same range and under identical conditions many times.

It is my firm belief that wind drift is controlled by a number of factors. Bullet weight and sectional density play an important part. There is also a very critical point in velocity between the speed of sound and about 2000 F. S. that is affected more than lower or higher velocity. When using a bullet of given diameter and size at over 2000 M. V., such as the Hornet, the 222 regular and 222 magnum, invariably the higher velocity is less affected. Another proven example is the 30-06 with 180 gr. match bullet of 2700 M. V. at 1000 yard target with same bullet at 3100 M. V. Time shooting vs the 300 H & H magnum after time this higher velocity has proven less affected by wind at this 1000 yard range. At the last National Matches at Camp Perry, I noticed two schools of thought on this subject. One was the Army's Advanced Marksmanship Unit from Fort Benning. They brought out a special blown out 300 Magnum with about 200 to 300 added feet per second over the 300 H & H on theory the quicker the flight with special bullets the less wind effect over 1000 yards. There were three matches in this category; Wimbledon, Leech and Herrick. In these matches some of the Army had bad luck, nothing was proven. On the other hand the Marines, who also experimented considerably, stuck to 300 H & H standard and a 26" barrel. They would smile when wind effect was mentioned. Maybe they knew something as they won their share of the 1000 yard prizes. The AAMU picked up practically all other honors.

I have related my experiences and would like to hear more from people who have proven some of the subjects I have touched on. I would like more knowledge about ballistics of modern cartridges. Such knowledge should come from field tests and not the sliding scale and reference book written by men who probably never fired a shot.

Another thing: A word on interior ballisitcs. We hear many things on this subject. Mostly theory on shape of case and sharp shoulders giving better performance. About all I find here is that such wildcats are hard to feed through our good standard magazines. They usually give some sort of magazine trouble sooner or later and usually at a critical time. Then we have arguments as to groove diameter relative to bullet diameter. Some disagree, but I like these two diameters the same. Another age old argument is the rifling twist or pitch. We shouldn't worry too much with this when we can take a good accurate 30-06 with 10" twist and shoot anything from 110 gr. Sierra at about 3400 M. V. to Hornady 220 gr. at about 2400 M. V. and keep them all within varmint accuracy. All this is another subject, I have probably said too much already so now will close.

Paul Wright
Silver City, N. M.

SIGHTING IN KINK

. . . . . This brings to mind something I have done many times in the past and have often wondered why no one ever put into print. Time after time I have seen others sighting in rifles of the .22/250 class with muzzle velocity in the 3400 to 3800 fps bracket and fitted with both target and hunting scopes, trying to get on the button at 200 yards.

Bench rest rifles with 20X or over scopes are one thing—we can spot the bullet holes with ease—but a hunting scope is something entirely different.

My method is to sight in at 50 yards where I can see where every shot hits. With rifles of the high velocity class such as I named above, and with the high scope position over the bore line, when sighted in to drive tacks at 50 yards the bullets will print approximately 1 inch above point of aim at 100 yards and be back practically on the button at 200 yards.

This much I can assure—the average varmint shooter has so few opportunities to sight in exactly at 200 yards in dead calm, plus the fact that he gains little knowledge of wind drift, that actual shooting at 200 yards rarely gets him sighted as well as he would like to be. I believe he would be more accurately sighted in at 200 yards by my method than he would by actual 200 yard shooting on an average summer day.

My new 6m/m is a case that again worked out almost perfect. Three shots fired at 50 yards with a BALvar 2½X8 to sight it in were followed by a five shot group at 200 yards. Make a 1¼" group in the aiming square of a 200 yard bench rest target. Naturally I could not spot a single shot through the BALvar at 200, so just went out and looked and there they were.

Paul Gottschall—Salem, Ohio

FROM ROY DUNLAP

Dear Phil:

It's time for another letter to the editor—want to comment on the very good letters published. Starting from the front and going down the line; Mr. Jenkinson's letter on handloading reaffirms the fact that it's stupid not to wear glasses when doing any form of test shooting, if not at all times when shooting. Many, many unproven handloads have been published and recommended, based usually on performance in a single arm. A friend of mine once blew two 1917 Enfields one right after the other, with a load recommended in a very well-known book on handloading. Only a 30-06 with oversized bore could possibly stand it. The Winchester 70 does not have adequate control for gas and brass in event of a case failure or excessive overload. It is still the most advanced Mauser-type bolt action made and thoroughly safe for all normal ammunition, plus a good safety factor, but isn't a pressure gun or testing device.

Jim Scoville brings out a good point—the future of shooting in this country will mostly be in the target line. Today we still have much hunting and plinking, but in twenty-five years residential development due to population increase will force probably 80% of would-be shooters to fire on a target range if they are to fire at all. Sounds far off? Does 1935 sound far back? The ten-year-old boy learning to shoot today will in 1985 be a young family man established enough to shoot more than a little and begin thinking of teaching his son.

Creighton Audette on barrel movement I agree with. Believe that back in the 30's the Peters Company did a lot of spark-photography--don't remember what if anything came out on barrel whip, but they showed a lot of things. The Germans Cranz and Koch went far deeper into both interior and exterior ballistics than anyone else and while I believe there are three or four sets of their books in the U. S., no translation of the small-arms data has been made. A mathemati cian of Einstein rank would be needed! I'd give a lot to know some of the data on bullet acceleration from the case. Whip has been known ever since the first high velocity bullet was fired through a slender barrel. The Europeans tried to control barrel movements with steps, but this works only with a single load giving fairly uniform nodes, of course. I am afraid only very loose generalities can be developed on the subject because of barrel action changing with every charge, and bullet. A couple of my own experiences may be of interest. Years ago I made myself a monstrous .30 Newton sporter. With one load, one particular bullet, it would shoot to identically the same point of impact at both 200 and 300 yards. With any other load, or even with the same charge and different bullet of same weight, it has normal ballistics, dropping 4 to 5 inches at 300 yards. Something about the one bullet makes the barrel whip so that angle of departure is changed enough to make the bullet cut line of sight first at 200 yards, rather than at 20 to 40 yards from muzzle as is normal. Further confusion—the rifle has one of the old original Cutts .30 Rifle Compensators on muzzle, a large and rather heavy steel muzzle brake. Removal of this weight does not appreciably change point of impact! (Does on shoulder)

(Continued on Page Thirteen)

National Bench Rest Shooters Association, Inc.

NBRSA OFFICERS AND DIRECTORS FOR 1960

EASTERN REGION:
Irven M. Mohnkern (President)
232 So. Patterson
State College, Pa.
Paul O. Gottschall (Vice Pres.)
R. D. 4
Salem, Ohio
Robert W. Hart
300 West Fourth St.
Nescopeck, Pa.

MID-CONTINENT REGION:
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Pawnee, Oklahoma

NORTH CENTRAL REGION:
Walt C. Siewert
Box 749
Custer, South Dakota

GULF COAST REGION:
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Dallas 14, Texas

NORTHWEST REGION:
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606 West Galer
Seattle 99, Washington

MISSISSIPPI VALLEY REGION
Ted Holmes
R. R. #1
Mattoon, Illinois

SOUTHWEST REGION:
(Director vacancy)

Secretary-Treasurer
P. H. Teachout
64 Depot Street
Lyndonville, Vt.

NBRSA MEMBERSHIP DUES:

Individual annual dues $5.00 (includes magazine subscription for membership term). Associate member (wife or husband, son or daughter under 18 years of age, of member in good standing—no magazine) $2.50. Life membership, $75.00. Annual club affiliation fee $10.00.

NATIONAL BENCH REST CHAMPIONSHIPS

VARMINT AND SPORTER CHAMPIONSHIPS at San Angelo, Texas, August 18-19-20, 1960. Contact Mr. F. L. Magoon, Box 909, Kerrville, Texas.

UNRESTRICTED BENCH REST RIFLE CHAMPIONSHIPS at Tulsa, Oklahoma, August 23-24-25, 1960. Contact Mr. E. A. Anderson, 3604 South Toledo, Tulsa, Oklahoma.

1960 BENCH REST MATCHES

EASTERN REGION

Detroit, Michigan: April 24, July 24; Detroit Bench Rest Club, Jack Roy, Sec'y, 2446 Hewitt St., Hamtramck 12, Mich.

Staunton, Virginia: April 30-May 1; Oct. 8-9: unrestricted bench rifle—varmint rifle if 10 or more entries; Stonewall Rifle & Pistol Club, Jim Perry, Box 471. Staunton, Va.

Augusta, Ohio: May 7-8, May 28-29, June 18-19, July 16-17, Sept. 17-18; Reed's Run Rifle Range, P. O. Box 66, Augusta, Ohio.

Dryden, New York: (Varmint rifle matches) May 15, June 18-19, July 9-10 (Eastern Region Varmint Rifle Championships), Sept. 11; Dryden Fish & Game Club, Russ Cuatt, Sec'y, 113 Park St., Ithaca, New York.

Plainfield, New Hampshire: May 22, July 16-17, Sept. 18; Plainfield Rifle & Pistol Club, Leslie R. Stone, Sec'y, Plainfield, N. H.

Easton, Ohio: June 11-12, Aug. 6-7; Chippewa Rifle Club, Nelson Berger, Sec'y, R. D. 1, Box 192, Marshallville, Ohio.

Southboro, Mass.: June 26, Aug. 14, Oct. 16; Southboro Rod & Gun Club, c/o J. W. Baldwin, 5 Milk Street, Westboro, Mass.

LOWELL B. WELCH

NBRSA member Lowell B. Welch of Indianapolis, Indiana, suffered a heart attack while attending a meeting of the Mid-State Shooting Club on March 7th and died only minutes after arrival at a hospital.

Mr. Welch was a leader in promoting and organizing the first bench rest shoot conducted by the Mid-State Shooting Club last November and had planned on taking an active part in the club's programs this season. He will be sorely missed by his many friends in the shooting fraternity.

Lewistown, Penna.: July 2-3 (Eastern Region Bench Rest Rifle Championship); East End Blue Rock & Sportsmen's Club, c/o P. J. Aurand, Milroy, Pa.

Johnstown, New York: Sept. 3-4 (Annual Labor Day Shoot); Pine Tree Rifle Club, Wm. N. Hare, Sec'y, R. D. #1, Johnstown, N. Y.

MID-CONTINENT REGION

Kansas City, Kansas: Apr. 30, Aug. 6, Oct. 15; Mill Creek Rifle Club, Inc., L. F. Carden, Sec'y, 2211 No. 44th St., Kansas City, Kans.

Tulsa, Oklahoma; May 15, June 11, July 16. Aug. 14, Aug. 23-24-25 (National Championship, Sept. 18; Tulsa Bench Rest Rifle Club, E. A. Anderson, Sec'y, 3604 So. Toledo, Tulsa, Oklahoma.

Wichita, Kansas: May 28, July 2-3, Oct. 2; Wichita Bench Rest Rifle Club, Larry Engelbrecht, Sec'y, 122 Gow, Wichita 3, Kansas.

MISSISSIPPI VALLEY REGION

St. Louis, Missouri: Unrestricted bench rifle, June 5, July 10 (Mo. State Championship) Oct. 2; Varmint and Sporter, May 1, June 26, Aug. 14; Bench Rest Rifle Club of St. Louis, James R. Ernst, Sec'y, 2230 Ferncliff, Kirkwood 22, Mo.

Florissant, Missouri: Varmint and unrestricted rifle matches; contact Richard E. Davison, Sec'y. Nine Ring Sportsman's Club, Route 1, Box 812, Florissant, Mo.

Windsor, Illinois: July 23, Aug. 6 (night shoots), Sept. 25 (day—Mississippi Valley Regional Championship); Windsor Rod & Gun Club, Robert Adams, Windsor, Ill.

NORTHWEST REGION

Renton, Washington: Unrestricted bench rifles, June 25-26, July 30-31; Varmint and Sporter matches, Apr. 10, May 8, June 12, July 10; Seattle Precision Shooters Club, Roy E. Meister, Sec'y, 3938 Ashworth, Seattle 3, Wash.

SOUTHWEST REGION

Yreka, California: Varmint, Sporter and unrestricted bench rifles, May 28-29, Sept. 3-4; Yreka Rifle Club, Inc., c/o Ray Jones, 508 Knapp St., Yreka, Calif.

GULF COAST REGION: San Angelo, Texas, National Varmint Rifle Championships, Aug. 18-19-20; contact F. L. Magoon, Box 909, Kerrville, Texas.

NORTH CENTRAL REGION

Custer, South Dakota: May 22 (Chuck shoot—Varmint & Sporter), June 12 (Sporter and unrestricted bench rifles), July 30-31 (Unrestricted, Varmint and Sporter); contact Walt Siewert, Custer, So. Dak.

Buffalo, Wyoming: May 8 (Crow Shoot), July 16-17, Mid-Summer Bench Rest Matches, Buffalo Outdoor Rifle Club, Martin Pelloux, Clearmont Rt., Buffalo, Wyo.

Iowa Falls, Iowa: May 28-29, July 2-3, Sept. 3-4; unrestricted bench rifle, varmint and sporter rifles; Verle W. Hunt, R. D. #2, Ackley, Iowa.

NATIONAL SHOOT PREPARATIONS

ACCOMMODATIONS FOR COMPETITORS: At mid-March 5 of the 8 units in the little motel at Skiatook, nearest town to the Tulsa Bench Rest Rifle Club range, had already been reserved by competitors for the National Shoot period. However, the Skiatook Chamber of Commerce has promised the Tulsa Club to arrange for some rooms in homes there to accommodate competitors.

Since the 1958 Nationals there have been several fine motels opened on South Peoria Avenue, the direct road from Tulsa to Skiatook, approximately 23 miles. Competitors wishing to make accommodation reservations should write to the Tulsa Club secretary, Mr. E. A. Anderson, 3604 South Toledo, Tulsa, Okla.

IMPROVEMENTS AT RANGE: Facilities for camping at the John Zink Range are being enlarged and improved and Mr. Zink has contracted for having new, modern sanitary facilities installed. Since the 1958 shoot the little creek at the range has been dammed to create a new lake adjacent to the range.

The Tulsa Club is making an all-out effort to assure maximum comfort and pleasure for competitors at the 1960 National Shoot.

WITCHITA BENCH REST RIFLE CLUB (Kansas)
Day shoot, March 20, 1960

Aggregates	100 yds.	200 yds.	NMC
H. W. Barton	.500	.711	.605
L. F. Carden	.520	.7655	.642
J. G. Muder	.521	.916	.668
H. Baucher	.541	.843	.692
VARMINT RIFLE			**grand**
C. Kunkle	.503	.821	.662
F. Cunningham	.792	.9935	.892
HUNTING RIFLE			
Hutchinson	.792		
SMALL GROUPS			
H. W. Barton	.275"	.760"	

BEGINNERS CORNER
Robert F. Stinehour

STOCK FINISHING

Ever since I started doing stock work I've experimented with all the finishing systems in the book, and many that are not in the book, in search of a finish that would stand up in all kinds of weather, look nice, and not take forever to get.

After finishing a season of hunting, with more bad weather days than I can ever remember hunting in before, much of it in real rough country, and my rifle still looking like it was finished yesterday, I feel I have something worth passing along. My system of finishing has much more advantage to one who does stocking in some quantity than to the individual doing a single stock, as several components are required. I haven't made a time check, but am sure the work time is at least 50% less, per stock, than any other method I've used. The most open grained wood that is practical for a stock can be finished in a maximum of 5 weeks, and not have a pin hole open, if done properly.

Five weeks may sound like a long time to some people, but for a super finish it is not. A straight oil finish comparable to this would take months. Patience is a **MUST** if a good finish is desired, regardless of the method used.

Taking the stock from the needle tooth rasp, all rasp marks are removed with the fine files. Many people use too course a grit paper after the files and put deep scratches in the wood that take much time and effort to remove with the finer paper. After the file I use **medium flint** paper, which removes file marks easily, and then extra fine flint. The

stock will not be glass-smooth but is ready to start the finish. Here is where much time is saved, by not using 240, 320 and 400 paper, and no "whiskering." One can spend hours whiskering an open grain piece of wood, and then **weeks** trying to fill it again.

We start the finish with a mix of 50% turpentine and 50% Val-Oil (product of Val-Spar Corp.), applied with a brush and rubbed in by hand. At 24 hour intervals apply additional coats, for 4 to 6 coats depending on the texture of the wood. The oil and turp. will dry in less than 24 hours, but don't rush it, 24 hours is best for good penetration.

From here we use GB-Linspeed (product of George Brothers, Great Barrington, Mass.) and Sun Ray siliconized stock finish (Sun Ray Chemicals, 303 Pine Ave., Fresno, Calif.). Starting with the Sun Ray, and alternating with the GB, apply a coat every 24 hours as with the turp. and oil. Rub each coat well by hand. Use 10 to 14 coats. It only takes about ten minutes a day as this is only the filling process, and need not be fussy.

The stock will not look "filled" now, even if it is fairly close grained, but it should be filled. It's now time for the extra fine flint paper again. I've seen people use a whole sheet of paper folded up. This is very wasteful and clumsy to user, and will be so large as to hit and spoil some shaped places. I cut my paper to about 2 inch squares and fold once. Using the "little woman's" scissors for this will keep her very happy too, as there is no better way to sharpen scissors than cutting sandpaper.

The extra fine flint paper will fill up fast as the finish is gummy. Use this paper just to remove all "gum." Don't over use the paper—when it is filled chuck it and get another square.

Now we use 240 Garnet paper and it shouldn't gum up too badly if the fine flint was used enough. When the stock is finished with this paper it should be smooth and completely filled. Follow this paper with 320 and then 400.

The biggest mistake in sanding is to jump from paper to paper. In **ALL** sanding the article should be completely gone over with one grit before going to the next.

The stock should now be glass smooth and feel hard. Wipe thoroughly with a clean soft cloth and be sure to blow all dust from the inletting. From here on the job must be kept absolutely dust free, as one does not want a gritty finish.

Now that the stock is nicely filled and sealed the finish from here on is a matter of preference as to how much lustre one wants. I personally do not like a high gloss finish on a stock that is to be used in the field.

If one prefers less gloss the Sun Ray applied at 48 hour intervals, well rubbed, is the answer. For a high gloss use the GB in the same manner. Alternate coats of Sun Ray and GB also gives good results, but regardless of which method is used the best results will be had by allowing **48 hours** between coats. As many coats as desired can be used, but 5 or 6 should be sufficient.

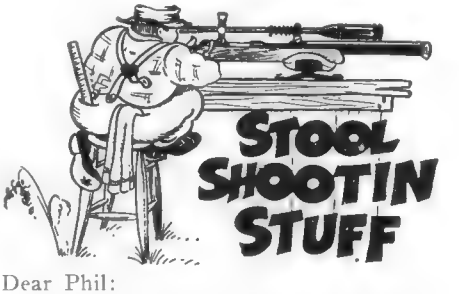
A finish in the drying process should not have too much heat, as some drying cabinets do, but also should be kept from humidity. I dry mine with a 72 degree room temperature with good results.

Though this may sound like a long process, the average sporter stock takes a total of about 8 man hours from the start of the Val Oil and turpentine. Eight hours in five weeks is very reasonable for such a fine finish.

I use a Silicote cloth to keep my rifles looking nice, going over stock, metal and all. After a day in the rain or wet snow, the piece is allowed to dry, wiped over with the cloth and looks like new again.

Both the Sun Ray and GB products are available at most good sporting goods stores. GB has been around for some time and has earned a well deserved reputation of being a good finish. Sun Ray has not been around so long but is equally good. Its fast drying and excellent moisture repelling quality make it a first rate finish.

To keep these two finishes from "jelling" so quickly, they should be stored upside down, once opened. Even doing this they will thicken some in time. I keep two bottles of each in operation at all times, using the two that have started to jell for fill only, and the fresher bottles for the final finish.



Dear Phil:

Ordinarily I open my new copies of Precision Shooting with enthusiasm and pleasant anticipation and it was certainly with this feeling that I several days ago plucked my copy from the roadside mailbox. I was shocked to open it and find the first thing striking my eye was that our good friend, John Unertl, had passed away. Indeed, he was a good friend to all of us and we certainly shall miss him. I know he enjoyed benchrest shooting and the fellows who participated in the game. In fact, I recently wrote to him and told him how we missed him and he said that he, too, had missed being at the shoots with us and that he looked forward to getting back in to more of the old routine this summer. Mrs. Unertl's enthusiasm for the shooters was nearly as great as John's and I often respected the efficiency with which she handled the display area as John was down on the line shooting or gabbing with the boys at their loading benches.

We shall miss Jack Rice, too, and although he was not so well known as John throughout the country, he was a fine supporter of our game and actively participated in it to the end of his four score years. We on the East Coast who knew him were fond of him and many of the activities near his home on the West Coast centered around him. I first met him at the San Angelo Nationals where he and my dog, Jock, became great friends and only this Christmas he wrote to Jock urging him to get his master and mistress to take him out for a visit to the West Coast. It is always later than we think and I am sorry now that we all didn't pile in the station wagon and do just exactly that. Happy shooting to two great guys, and as much as we may enjoy new comers to the game, we shall never forget those who in earlier years were such a vital part of it.

I have often taken up lines in this column writing about the enjoyable weather on Cape Cod and how free we usually are from the snow, but about the time I tucked the last letter to you in the mail box, we got a snow storm that really was a beauty. It established many new records and although we didn't face any great hazards as do many other people in remote sections of the country, we were without power and Merrie and I had to break out the camp lanterns and Primus stove. We had to buck our way out to the highway with the tractor and on several occasions tow the cars out in order to get to the nearby villages. The town roads were kept in excellent condition but the place that bothered me most was the course to the shooting range. I had just about had winter enough and was getting an urgent itch to get a little shooting in. All through the winter I had been scheming on one thing or another and was anxious to get out in the sunshine and see if they worked.

Yesterday was really the first day that seemed mild enough for outdoor shooting for a month or more and I chose it to test out a new Johnson PT barrel. It is really too early yet to see whether or not it is going to be as hot as the one Merrie has been using with such great success. We who have been beaten by her so many times don't give all the credit to the barrel but I am convinced that the progressive twist feature has merit from the experience I have had with that barrel and my 30 caliber which performs so nicely with the .308 case. The new .219 job is on an action and stock that I am very fond of and if a nice smooth uniformly grooved barrel means anything, this gun should shoot. I saw a lot of nice jobs going through down at the Johnson Automatics Associates factory who at the time I was there, were putting through a lot of 100 special jobs for one of the big arms companies.

I like the thoroughness with which Mr. Kemp, Mr. Stowell and Mr. Hill perform their gun work and I particularly think that the concentric to the bore outside grinding which they do along toward the final stages of making the barrel adds to the quality of the product. These folks haven't got so big that they cannot take care of special features that we benchrest shooters want.

Yesterday while shooting, I had a good opportunity to note how much mirage there can be on a winter day. We normally think of it as being associated with hot and quiet summer days but yesterday was rather cold compared to the weather in our mid season shoots and there was a shifty turbulent wind but the mirage was there just the same. The groups were nothing that would break any records but it did feel good to sit down and try to outguess conditions. I have often felt that we practice too frequently on the ideal days; however, practicing and testing are two different things and an ideal day is undoubtedly best for checking the performance of a particular barrel, bullet or rest.

I was particularly interested in the Allen Bench picture in the magazine, because it reminded me so much of several jobs in the early 50's which appeared at Johnstown. Roy Leon shot one there that appeared very similar to the one by Bench. His, too, was on a plank-like base, made from a compressed wood and plastic combination such as is seen on fine quality carving and butcher knives. He packed around the action tightly, lead wool, but the barrel was like the one pictured, hanging unhampered out in space. Roy placed in a number of matches and I think did as much as anybody else to prove the merits of the free floating bar-

(Continued on Page Twelve)

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STOOL SHOOTIN' STUFF

(Continued from Page Eleven)

rel principle.

At those same matches, a competitor by the name of Clark had a rifle similarly mounted except that his had a pistol grip about like those used by Colt or Smith & Wesson. He set the rifle in position and after sighting it, stood away and built up pressure in a little squeeze bulb through a tube which extended to another small squeeze bulb which, when expanding, formed pressure between the trigger bow and the trigger to actuate the trigger. Both of these guns and their operators were making considerable inroads in to the pockets of some of the consistent winners. There were several little huddles during the day to which Leon and Clark were not invited but that night at the Johnstown meeting of the Eastern Benchrest Shooters Association, the huddlers had made so much progress and solicited enough support to legislate a rule affecting such guns. This rule required that future guns on the line make contact with the shoulder and be fired by pressure on the trigger by the finger only. This was my first experience with steps taken to limit the extent to which experimenters could go. It was instrumental in driving out two good shooters and experimenters from the benchrest game. Under current rules, they would now be eligible, in the unrestricted class, but unfortunately there are enough shooters who feel that convention and experimentation are two different things and they should not be combined at National matches where the accent is on shoulder to shoulder shooting with as uniform conditions as can be devised for each shooter; namely, the drawing for benches and the rotation of same, and shooting within a minimum time limit at specified relays. Under such conditions, we can declare a person as the winner and the champion because he shot well in an open field. The average shooter at those matches can take his rifle home and rest it on a nearby fence post and transform a crow 200 yards off in yonder field to a patch of drifting feathers. Roy Leon could not do that with his plank mounted rifle very conveniently but he certainly did effectively demonstrate the free floating barrel. I make no claim that he originated it but from that stage on, the majority of barrels on the line were free floating.

Can we not somehow come to a stage where fellows like Clark, Leon, Meister, Austin, Gottschall, Bench and many others can bring an iron monster, to use the words of Bench in describing his rifle, or a lathe bed with cross feed which I shot beside at the San Angelo shoot, into competition among themselves, for certain trophies. The beneficial ideas demonstrated will eventually become adopted or rejected by the more conventional shooter as was the free floating barrel. As the matter stands now, the more conventional shooter is being driven out as the pendulum swings to the opposite side to that at which it was swinging at Leon's time. We need these conventional shooters in the game. They often can't afford a conventional rifle and a gadget rifle and devices, too, but they are the backbone of the shooting game, competitive down to the nails on their toes with a love for the smell of powder or the feel of recoil. They need to feel that they have a chance competitively. They love their guns and their method of shooting as a Westerner does his horses. They want to take part in the shoots but they can't see the logic in entering a fine thoroughbred against a five ton cleat tractor in a pulling contest. This doesn't mean that they don't enjoy going to a shoot as they would a farm show. Some of them would make entries in both classes and so, too, it can be at our benchrest matches. Certain of the NBRSA officials do not concur with this point but I certainly feel that more consideration must be given to it, if we are to expect many entrants and capacity crowds who return year after year.

The editorial that you wrote about getting things done to win the Olympics made me think of how many things the benchrest shooters as individuals and as a group have done to better our chances. I know there are a number of them who have not only taken part in the general trend toward greater accuracy and improved techniques but who have personally contributed much directly to our entrants. We have had the pleasure of shooting side by side with some of these fellows who came to our last year's matches, and we feel that they are the kind of fellows that we can depend on and be proud to have represent us. The best is none too good for them and through these associations, we have both received pleasure. They are going to have to hold and dope and let off at exactly the right time. No device is going to be available for them to put a bullet in the middle of the group while they keep one or both eyes on a pretty blonde walking up by the line.

Merrie says as she types this that our bench rest gang can be accused of a lot of sins, but the above isn't one of them, and better not be by one of them she knows pretty well. My answer is that it is later than you think, and I'll stick to the brunette I chose for better or for worse—but I might still look at a blonde if I didn't have to concentrate so much looking through the scope for my type of shooting.

Cordially,

Ernest Stuhlbacher

THE INFORMATION BENCH

The Information Bench service is available to all Precision SHOOTING readers. With your questions, send a large, stamped, self addressed return envelope for a reply. Selected questions and answers, covering as wide a variety of interests as possible, will be published in these columns. Address your questions to the following people.

Bench rest, varmint and hunting rifles, accessories, handloading, components and shooting methods—M. H. Walker, THE INFORMATION BENCH, RFD #1, Box 118, Mohawk, N. Y.

NRA and Free target rifles and shooting—Roy F. Dunlap, 2319 Ft. Lowell Rd., Tucson, Arizona.

Sporting handguns and loading—Kent Bellah, Saint Jo, Texas.

American Single Shot Rifles—Rupert S. Hill, 325 James St., Elkhart, Indiana.

Question: In your opinion what is the proper way to work up a load to get the utmost accuracy of a particular rifle for bench rest shooting? Leslie E. Smith, Jr., Ohio

Answer: First select the best bullets you can find, by first hand reputation, if no other method is available. In general, hand made bullets are best, but Sierra hollow point types have been known to beat the hand made kind. Starting with bullets of known quality, good cases with uniform neck walls, and fresh primers and powder, load a charge which is about 5-7% lower than maximum. Load the bullets to a length just missing the lands of the throat. Pick good shooting conditions, in the evening is best, just after the sun's heat is off the range. Shoot at least 20 shots, 30 is better. I prefer 5 shot groups, but 10 shot groups are OK. Then work up to the maximum load in ½ grain steps, shooting at least 20 shots with each load. When the primer starts to crater or the extraction get difficult or the accuracy go sour you have reached the maximum load. Measure the groups and average the groups with each load.

Record the results in a notebook which you keep for this rifle alone, and continue to record every group you fire as long as the rifle lasts. This is the only way you will be able to tell what your rifle is doing.

Pick the best load according to the averages or the smallest maximum group. Do not pay any attention to the smallest group. Repeat the test using ½ grain each way from the best charge to verify your original findings. If your best load remains the best the job is finished for 500 to 700 rounds. M. H. Walker

Question: I work in the Dakotas selling a farm magazine and get a lot of varmint shooting in the course of a year. I live in a trailer and have my arms with me.

Back in late 1940 I made up a bullet swaging press and one piece swaging die, extruder, etc. I have been using Kampen, Gardiner and RBS jackets. I have never used Sierra jackets. I bought some of Gardiner heavy jackets in .224 .705" length that made up the most accurate bullet I have ever used so far. How do you measure jacket wall variations? With dial indicator or wall mike? What is your first and second choice of bullet jackets? Wm. L. Jones, S. D.

Answer: The Gardiner heavy jackets are almost identical with the standard Sierra .705" .224 jacket. My own experience indicates that the Sierra are slightly better than any other I have tried.

Starrett makes a tube wall micrometer which can be purchased with a 3/16" anvil. This micrometer is probably the best for measuring jacket walls. A dial indicator set-up can be used if special effort is made to construct the anvil so the jacket does not stick and give an erroneous reading. M. H. Walker

Question: Where can I buy dies to crimp jackets on Jugular type bullets I'm swaging, so jackets won't shed in flight? A friend shooting light target loads had a jacket lodge in his barrel. Please comment on this. A. M. Schurman, Austin Minn.

Answer: Jacket shedding in the bore or in flight is eliminated with Harvey Cannelure Dies, available from Lakeville Arms, Lakeville, Conn., at $15.75. A Bullet Holder for an additional caliber is $6.50. Jackets are crimped as fast as bullets can be dropped in the die and the handle of your press operated. I highly recommend these dies, the only way you can make bullets to equal factory Harvey Jugulars.

Our initial tests indicated uncrimped jackets (or gas checks) might shed at a velocity more than 1,000 f.p.s. More recent tests prove some will shed at any velocity unless they are crimped on.

Your friend who had a jacket lodge in his bore was fortunate. Another shot might have ruined his gun, but I doubt his mild load would have injured the shooter. Hot Magnum handloads in the pressure range of the 30/40 Krag rifle might wreck a revolver with a jacket lodged in the bore, but I'm not positive. Let's just say I wouldn't hand fire one, or furnish a good revolver to find out.

Uncrimped jackets may shed in the bore as they jump from the cylinder throat into the barrel. It's more apt to happen if the bullet enters the bore slightly out of alignment. This is not uncommon, even with good loads and good revolvers. Smith & Wesson make their cylinders with a bit of play so a bullet can "find" the center of the bore. Colt revolvers are tighter, on the theory that bullets are more apt to enter the tube in a straight line. As both makes shoot about equally well, I can not say one system is better than the other.

A worse trouble, or at least one that is apt to happen more often, is the shedding of jackets and gas checks in flight. This is rather common. Load some straight wall cases with gas check bullets, then pull the bullets with an inertia type puller, and you'll find many gas checks often stay in the cases. Inertia pullers also loosen cores in uncrimped Jugular type bullets (and some rifle pills) so that I do not recommend this type puller to break down loads.

Despite the fact that some writers claim otherwise, gas checks or jackets shedding in flight cause an accuracy loss. Sometimes a large loss.

If bullets are swaged so they have a sharp edge base (similar to the factory 44/40 jacketed bullet, which is quite different to the newer Jugular types) powder gas under pressure may blow the jacket base and bullet core out of the bore, leaving the jacket sidewall in the barrel. Mason Williams had this happen, but fortunately noticed the condition before firing another round.

Inferior jackets can cause this trouble. Their fault may be in the drawing punch nose, or die, or in stock that is thin, hard or brittle. I've just made some tests with inferior jackets not crimped on cores, loaded with my charge of 20.2 grains 2400 in a .357 Magnum, and 27 grains 2400 in a .44 Magnum. Firing the .357, the third round shed the jacket in flight. The fourth left the jacket wall in the bore. This was detected immediately, as it was expected.

The other rounds, and the .44's, were not fired! You know why if you've ever removed a jacket wall from a bore! I can make more money at something else to buy a new gun barrel!

Jackets for swaged bullets should be top quality. (For **obvious reasons**) Harvey used a specification mild gilding metal (alloy). Jackets are accurately trimmed and the mouth cambered. After drawing, they are annealed to remove temper, then run in a bright dip solution and cleaned. They are held to close dimentions in length, thickness, base radius and diameter. All these dimensions and operations are important, if you want really safe and fine ammunition. I highly recommend Harvey's jackets, and those made by Bahler Die Shop, 1500 Thompson Road, Coos Bay, Oregon. Swaging dies made by both firms are good also. Dies should always be adjusted to leave a slight round edge on bullet bases, not a sharp edge. Kent Bellah

Letters

(Continued from Page Nine)

Second; several years ago I was doing considerable chronographing with a big Potter setup, very accurate. Using a very accurate .30-06 match rifle which gave fine accuracy at 600 yards with 55 grs. of 4350 and Norma 180 gr. match bullet, we checked the velocity carefully, then using same cases and bullets—same make, that is, and weighed out—we worked up loads with different powders to give the same velocity. On range testing at 600 yards, these loads which should have identical exterior ballistic—same bullet leaving same rifle at same speed—I found very great grouping differences. None equalled the 4350 load, but ran as much as three times group size. Elevations varied three minutes. I could only deduce that the various powders of different burning characteristics accelerated the bullet differently in the barrel enough to affect accuracy. Some powders start a bullet with a push, some with impact, some keep pushing for several inches, some don't, bullet may reach maximum velocity three inches from case, or it may take twelve inches to make it. The brisance of the primer has been proven to affect both velocity and accuracy. We can't change or regulate such things in normal shooting so must accept them. We do know enough not to use a fast-burning powder behind a heavy bullet in a big bottle-necked case, and that **most** cartridges give best accuracy at loads five to ten percent below maximum obtainable velocity, but the fine points of interior ballistics are beyond the individual handloader's control.

(Continued on Page Fourteen)

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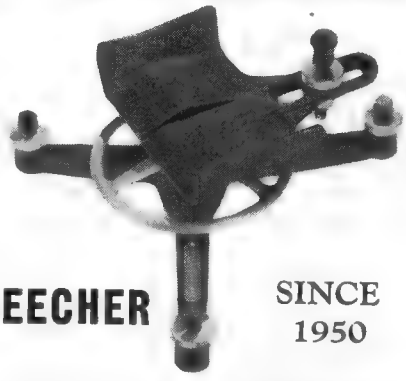

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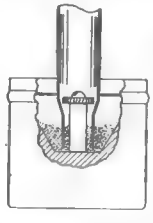

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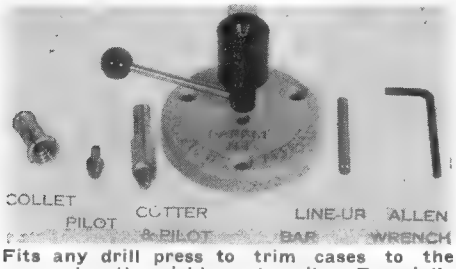

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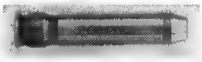

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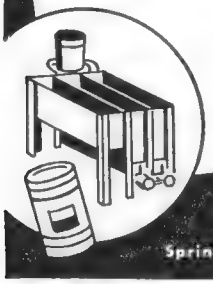

HEATBATH CORPORATION
Springfield 1, Massachusetts

Letters (Continued from Page Thirteen)

Incidentally, every handloader should read Naramore's book, "Principles And Practice Of Loading Ammunition" (Stackpole).

The boys with the super-hot .22, 6m/m and 6.5m/m's better start playing with steel jackets—soft-swaged benchmade or even factory hard-swaged jobs have limitations. Back when I used to make sporters I built a .300 Improved sporter with integral muzzle brake, capacity a grain or so more than the Weatherby case. Customer came back in a week complaining every third or fourth bullet got lost—he'd worked up a nice varmint load of 76 grains 4320 and 150 gr. Remington bronze point. Finally one blew apart inside the muzzle brake and he found out where the lost ones were going.

On the gun writer, it's true that a lot of the present-day boys show very, very limited experience, but a few of the writers of thirty years ago were off the ball quite often.

Yes and no on the barrel stress-relieving. Aging is not the same as stress-relieving with heat, but goes with it. Every steel alloy has different characteristics. Metal molecules settle down after every machining or heat treatment, however slight. I have heard (this is hearsay, now) years ago some of the military finishes which required hours in very hot solutions affected metals in this respect. Every ten years somebody tries magnetizing barrels to line up the atoms, etc. Never have proved anything much. Even hard-swaged jacketed bullets change with age—Western once told me they aged their 180 gr. .30 boattail bullets several months before loading as tests proved accuracy improved over that of fresh made bullets.

Rod Manson's blast at U. S. manufacturers' prevailing tendency to give the customer what they want to sell regardless of what he wants is rather true, although Remington will sell 40X receivers and barrel assemblies, also complete bolts (unfortunately not always headspaced for each other). Maybe only sell to gunsmiths, I dunno. However, he's lucky they let him buy a Lion, Walther or Anschutz—lemme bend your ear awhile longer on this. Almost a year ago I located a small European maker of a very good international-style shooting coat. Cloth, not leather, not too hot to wear or expensive to buy, so I brought in a few for trial. Almost every position shooter who saw one wanted it. So, I was getting set to run ads with illustrations, etc., and bring it out when a leading U. S. shooting coat maker asked me for one to "see what was new, etc." Having been on friendly terms for years (most of which I spent trying to get him to make such a coat) I sent him one. Then I got a letter from lawyer telling me I was infringing the man's patents, couldn't import or sell the coat, and so on. There being about as much resemblance between the two coats as between a pickup truck and a new Imperial, I protested, but in letter to the manufacturer himself added that I would prefer to buy such coats from him if only he would make one. My answer was an arrogant legal letter threatening everything but bodily harm, ordering me to confess I was infringing, to pay for it, to stop it, under no circumstances to advertise my coat, etc. Not having all the patent data, I had to sit still until I got it—all not in yet. The U. S. maker is desperately trying everything possible to keep this superior competing coat from reaching the shooters, or even knowledge of its existence! There was no mention of license or royalties—standard legal procedure when a justified grievance exists. Just a demand not to import and sell the competing coat, which, incidentally, is registered with European patent offices and is a legal item of trade—and also sells at almost twice the price of the U. S. jacket here. I did obtain a copy of the complainant's U. S. patent and it covers every feature of a normal shooting coat so that it is impossible to make a satisfactory shooting coat **in the U. S.** without infringing. However, the patent claims as his own original ideas shooting-coat features used by various U. S. makers a generation earlier. Shoulder-pad detailed precisely as an original idea is exactly the same as that used on the old Marine Corps shooting blouse in production twenty years before the patent was applied for! All the people tied into the shooting game aren't trying to help it.

I've often been asked why I haven't patented some of my ideas, such as the lever-locking system, my position scope stand, etc. My stand is that if anyone can make my stuff as good as I can at my price, he's welcome to try. If he can make it good, and cheaper, better yet—I'll quit and buy from him! More profit from selling than from making, I hear.

Roy Dunlap

DISCUSSING BARREL "CURING"

Dear Phil:

In the February issue of Precision Shooting you published my letter, and others, on the subject of "Curing," or "Stress Relieving," of rifle barrels. Here is some more dope on the same subject.

The bench rest shooters (Ed.—?) are naturally interested in how Pope made his barrels, and the way he applied his knowledge of "Curing by shooting." But I believe they would be much more interested in how and why "Curing" can or cannot be used to an advantage in our modern day precision rifle barrels.

At the present time, Hart and Douglas barrels are the ones most used in rest shooting, and I will try to cover the subject in relationship to these makes of barrels.

Basically, the manufacturing operations of Hart and Douglas are the same, with the exception that Hart laps his finished barrels and Douglas does not. They both start out with bars of steel that have been heat-treated to correct hardness and "stress relieved." Then they are drilled, reamed and "Button Rifled." The process of button rifling does not cut any steel out of the barrel. As the Button is pushed or pulled through the barrel, it cold forms or swedges the rifling into the steel. This swedging action puts terrific stresses into the barrel, and the barrel must **again** be "stress relieved" by heat-treating.

Metallurgists will tell you that a piece of steel correctly stress relieved by the heat-treating process, is as free of stress and strain as it will ever be. But, due to circumstances such as the operator of the heat-treating ovens not doing the job correctly, or some other unknown factors, it is possible for the barrel to still have some stresses in it and shooting will relieve these stresses or "Cure" it.

Let's see, by way of an imaginative example, if "Curing" by shooting can be of advantage to us.

Ernest Stuhlschuter has a 22 caliber Douglas barrel which is "shot out." Now this barrel was originally "stress relieved" by Douglas, and thoroughly "Cured" by the thousands of rounds fired through it.

Ernest sends the barrel back to Douglas to be re-bored to 6m/m. Doug-

las bores, reams and "button rifles" the barrel to 6m/m. **Here** is where the monkey wrench gets thrown in. The "button rifling" process puts strains back into the barrel and it must again be "stress relieved" by heat-treating.

Ernest is now right back where he started, with a barrel which is "stress relieved" but not "cured." This is the probable reason why Douglas and Hart do not do any re-boring, as there is nothing gained from the standpoint of "curing" in their manufacturing methods.

There is only one way that I know of to take advantage of this "Curing" by shooting in a barrel which has been "button rifled." That is to take a new barrel and put one or two thousand rounds through it. By this time it should be thoroughly "Cured." Then, lap the barrel. If the barrel is correctly lapped, you should have the best barrel money can buy, as the barrel should be completely free of stresses and the bore perfectly uniform.

In my last letter I stated that it would be hard to prove that any further "Curing" after the stress relieving would be beneficial to accuracy, and I still think so. Even though the barrel may shoot better after it was "Cured" and lapped, it may do so because the lapping made the barrel smoother, or took out some tight spots, or improved the throat. It will take a great deal of experimenting to prove anything one way or the other.

It is my own opinion that when you buy a Douglas or Hart barrel, it is, from a practical standpoint, free of any stresses which may be harmful to accuracy, and the shooter need worry no more about it.

Perhaps my experience as a gunsmith can help prove this point. In years past, when a gunsmith was turning down a barrel, he did so with clenched teeth and a prayer. Because, if the barrel had internal stresses, it would very likely warp during the turning operation. There are two of us doing barrel fitting, here in Dryden, and in the past five or six years have used nothing but Douglas and Hart barrels. Many of these barrels were turned from the straight blank down to sporter and feather-weight sizes, and we have **never** had a barrel warp.

All this yakking has been about barrels that were "button rifled." Barrels that were rifled by the "Cutting" method may be a horse of a different color. It would be interesting to hear someone's ideas of "Curing" applied to barrels which were "Cut" rifled.

Edward M. Shilen Dryden, New York

(Editor's comment: These discussions of "curing" barrels have been largely a matter of personal opinion and conjecture. There would appear to be no good purpose served by continuing such discussions in these pages.)

MAYBE "ME TOO"

Dear Mr. Teachout:

I would like to add my two cents worth to what Mr. Donaldson said in regard to gun editors and writers and by way of rebuttal to Mr. TechniCull Editur and his excuses. The editor of the "newsstand journal" can improve his position in the battle for the gun-nut's fifty cents just by reading the stuff before he prints it.

In reading a good part of the gun articles written in the past thirty years (and some written a lot earlier) I have become pretty disgusted with some of the sloppy stuff that has been printed in some of the newer and more common "newsstand journals." Miscaptions are common if two or more pictures are on the same page or connected with the same article. Some writers have proven that they cannot tell one type of gun from another or even count correctly, and from there you go to downright misinformation.

For some time now, I have been looking for a Model 20 Savage in .30-06 caliber. I am pretty sure that it does not exist as all of them that I have seen were too short to take that long a cartridge, but one of our editors has claimed such an animal was made and sold. I saw a letter from Savage which states they were never made but when the editor in question was written and the letter quoted, he stated that the company was mistaken!

Recently I received a flier from a large, well-known publishing house announcing a new gun book that every shooter should have to read on cold winter nights. After reading the advertising and noting an average of one mistake or

(Continued on Page Sixteen)

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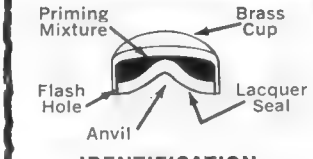

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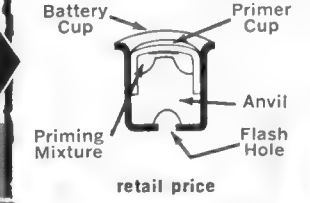

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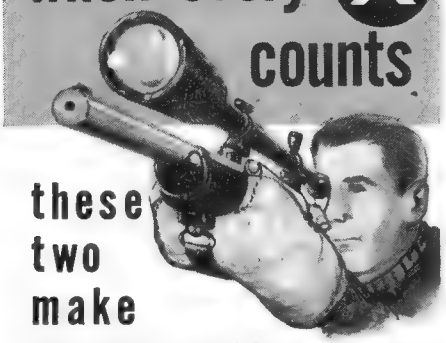

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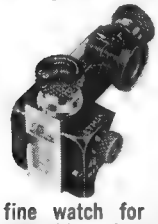

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ORINDA, CALIFORNIA

Letters (Continued from Page Fifteen)

error per page, I decided that it would be a darned cold night that I parted with the price for that book.

Also, we have the gun editor who never seems to fail to shoot minute of angle with any new sporter or plinker which comes his way. I wish that the guns I see would run so uniformly good. I wonder sometimes if it is false pride or payola.

Mr. TechniCull Editur cries that a gun wrtier is under paid, but from what I have seen of some of their work, they were over paid if they got a cent. It might help if the writers would forget trying to appear the great all-knowing expert and settle down to writing in an area that they know. Of course, this would limit some of them to a pretty small area.

Enclosed you will find my renewal and a check for the next three years of Precision Shooting. I have read with interest the articles and comments published within your pages the last four years, and look forward to at least another three years of information, opinions and entertainment.

John W. Dicks Salina, Michigan

(Editor's comment: Precision SHOOTING is not above criticism for errors on the printed page, and there have been some few miscaptions on photos in the past, and even photos up-side-down in a very few instances that we can recall. None of that was intentional, of course. We quite frankly admit mistakes, and make follow-up corrections when that seems called for. We are honestly trying to do better as we go along. It isn't necessary to mention that this editor **is not** a shooting or gun "expert" for that has been self-evident. This editor has probably learned as much or more about firearms and shooting from the information you people have chipped in to the publication "kitty" than any one of you readers have. If he lives long enough he might get cocky enough to "think" he was an expert, but heaven-forbid that day.)

HISTORY IS OF VALUE

Dear Phil:

I was glad to note in Roy Dunlap's material the reference to the work of the Germans Cranz and Koch. I have been endeavoring for some little time to locate a copy of their works and I think I am on the track of one now. Some of my associates are engineers of German extraction who are capable of translating, and although I would not ask them to attempt a complete translation of such a work, perhaps information as to the conclusions of Cranz and Koch and some idea as to their experiments would be of great interest.

It has been my own conviction that whenever one is attacking a problem, the first thing to do is to find out if someone has investigated the problem before and then dig up all the published material. The vast knowledge which is available in the world today is merely the result of step by step building of knowledge on the discoveries of people who have gone before. It is perfectly true that sometimes we find these people have taken the wrong course and perhaps for a time they may lead us astray but nonetheless, the sum total of knowledge available in the world today is simply the result of building on the experiences of people in the past. The greater pace of our developments at the present time than in past years, is simply the result of the broader base of information on which to build.

To get back to the subject of guns and shooting, there is a comparative dearth of technical information written and published here in America on this subject. It seems to be the trend to stay away from the basic theory and the tests and experimental work involved therewith and write in a more popular style so as to obtain greater reader appeal. To the best of my knowledge we have really no works in this country to compare with the various editions of the British Textbook of Small Arms, or some of the English books such as Fremantle's "The Book Of The Rifle" and various French and German publications. Now it may be that such works are available and used in our military colleges and at advanced courses given to Military Personnel etc., but at least they do not seem to be commonly available to the general populace.

It sometimes appears to me that many of our present day shooters and rifle experimenters do not really recognize the age of the science of ballistics and the fact that nothing much new about it has been discovered in the last 50 years. In some correspondence which I had a few years back with Wallace H. Coxe, who at that time was head of the DuPont Ballistics Laboratory, he made the flat statement that there had been no new developments in the science of ballistics for the last 50 years.

I have a copy of Fremantle's "The Book Of The Rifle" published in 1901. In this book, Fremantle suggests the deliberate canting of a rifle to provide wind allowance. He states that certain well known British marksmen of that time were using this method. A recent issue of "Precision Shooting" contained an article making the same suggestion. I am in no wise diminishing the usefulness and value of the article which appeared in Precision Shooting, I merely wish to point out that these things were known a great many years ago. (Gun Editors who write in letters defending some of their absurd, sensationally written, and sometimes positively dangerous articles, please take note that the basic scientific foundations of Rifle Shooting as discovered in the past century are still valid today.

On the other hand there is nothing new about exaggeration, even in the field of firearms. Cellini, in his autobiography, covers this thoroughly, and he lived in the period 1500-1571! He even outdid our modern writers. The gun which he built for himself not only was far more accurate than the guns owned by his contemporaries, it carried point blank for 200 paces when the weight of the powder charge was one-fifth the weight of the ball, and he invented and used a special noiseless powder, which did not frighten the game in the area where he was hunting.

Chapter 12 of Fremantle's "The Book Of The Rifle" covers the movement of the rifle in firing, its vibrations, jump and flip, effective vibrations on accuracy, and many other things concerned with the interior and exterior ballistics. The following is quoted from this chapter:

"We have digressed somewhat from the subject of the movement of the rifle before the bullet leaves it as affecting the sighting. Experiments have been made on the matter in this country by Captain Close, R. E., and in America by Dr. Crehore and Dr. Squier, the method employed being to obtain photographs showing the course of certain points on, or attached to, the barrel. These go to show that as ordinarily fired in the hands of a man the whole rifle moves about an eighth of an inch before the bullet quits

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4. First and Second places, 300 meters, Du Bois, Pa., 1957, Clair Taylor and Don Rob
5. National Match Course, Du Bois, Pa., 1957, 1st, 3rd, 6th, 7th places.
6. National Match 10-shot 100 yd. aggregate, Augusta, O. Al Creighton, .3105".
7. National Bench Rest Championship, Johnstown, New York, 1955, Sam Clark, Jr.
8. 10 Shot 200 yard WORLD RECORD, Du Bois, Pa., 1954, Sam Clark, Jr. Score, or Group, .5276"
9. 10 Shot 200 yard WORLD RECORD, Du Bois, Pa., 1956, H. L. Culver (Present record) Group size .4016"
10. 1000 Yard, Famous Wimbledon match, any sight, 1955, Camp Perry, O. Frank Conway.
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the muzzle. Indications are also obtained of the bending of the barrel under the stress of firing. Investigations on the same subject have been made by Messrs. Cranz and Koch, at Stuttgart, in 1899-1900. They have dealt very completely both with the movements of the different points in the length of the barrel and the effect on these movements of variation in the charge, and have also tried the effect of varying the degree of resistance opposed to the recoil of the rifle. Mr. A. Mallock, C. E., in a paper read before the Royal Society in June, 1901, on the 'Vibration of Rifle Barrels,' has dealt with the subject from the mathematical point of view, basing his calculations on observation of the whole rifle as a vibrating system."

Does any reader of "Precision Shooting" know of the experiments of Dr. Crehore and Dr. Squier? It would be very interesting if we could obtain information on this. The Messrs. Cranz and Koch are, of course, the same ones as referred to in Roy Dunlap's letter.

To get back to the subject of barrel vibration and whip, I do not know if a rifle barrel does vibrate while the bullet is passing down the bore. There does seem to be very definite and conclusive evidence that the whip does occur during the bullet passage and I am equally convinced that vibration does occur in the gun barrel; however, it is possible that this vibration starts only after bullet exit. There seems to be some evidence to indicate that the vibration does occur during bullet passage. Fremantle refers to a test in which an experiment was tried with a rifle shooting at 200 yards and then cutting off 1 inch of the barrel, repeating this procedure several times, cutting an inch off successively after each test and checking the point of impact. He states "Each alteration of an inch altered the sighting considerably at 200 yards, the bullet being thrown higher or lower." The wording is not entirely clear and positive nor are complete details of the test given. Nonetheless, the inference from the above would indicate that sometimes the point of impact was higher after cutting off an inch and sometimes it was lower. Can this be explained by the theory of pure whip, assuming as of course we must, that the same bullet, cartridge and load were used throughout the test?

In the articles by Grigg and the reprint of Harry Pope's article which have appeared in recent issues of "Precision Shooting" I must confess that I am not quite clear as to the reason for strain on the rifle barrel making it impossible for vibration to occur during bullet travel. A piece of piano wire under tension between two nails is certainly under strain and yet it vibrates beautifully when struck. If the ends of the wire are supported by non-resonant materials, the wire still vibrates when struck but the vibrations are very quickly damped out. From the last point of contact in the forearm forward, the usual rifle barrel is surrounded only by air and there is nothing to damp the vibrations.

I look forward to the letters and comments which I am sure this will arouse.

Very truly yours,

Creighton O. Audette

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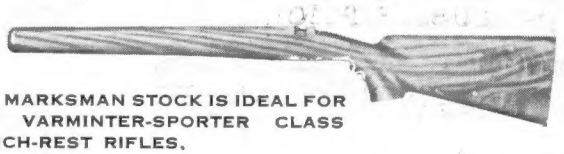

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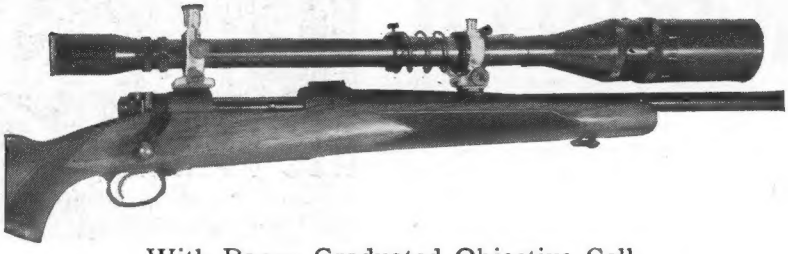

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FROM HARVEY DONALDSON

Dear Phil:

The shooters have more or less run me ragged in the last few weeks, with a lot of extra correspondence, so I have had to neglect my letters to you. Have just received my March copy of P. S. Have read with a great deal of interest the comments of the Distinguished Marksman, Mr. Paul Wright of Silver City, N. M.

I wonder if Mr. Wright understands that some of my own letters are written with the deliberate intent of starting something, and by so doing (I have your approval) bringing out more comment, from other shooters, on the same subject.

I note that Mr. Wright has used a 7m/m rifle, having a nine inch twist, with excellent results, but I see no mention of his own use of a rifle in this caliber having a twelve inch twist. Could it be that he is simply giving us his own opinion of this little matter, rather than putting it to the TESTS that I have done. My practice has been to report my findings exactly as I find them through my own testing, and while I might have an opinion one way or another, what finally appears in print is simply the results of my own testing. These tests showed that the 12" twist would stabilize the 175 gr. bullet at a much greater range than one would expect to use this long, heavy bullet.

If Mr. Wright wants an example of the slower twist let him use the .300 Magnum, which no doubt he has, and as Winchester makes it with the twelve inch twist. With the long 180 gr. bullet the shooters have no fault to find with the accuracy of this rifle way out to 1000 yards and beyond. Would Mr. Wright order a rifle in this caliber with a nine inch twist? I wonder? The SHAPE of the bullet has all to do with its performance. I have found that each design or shape of the point of the bullet has one certain velocity at which it will give the best accuracy. Some of the long round nose bullets, such as the 175 gr. in 7m/m caliber, seem to perform better in the slower twist, over those having a long slender sharp point, and in some 6m/m rifles with the SLOWER twist, the round nose 100 gr. Hornady bullet will give better accuracy, out at 200 yards, than will the same weight of bullet in the sharp spitzer point.

But still if you should ask the average shooter about this he would tell you it could not be done. One can always use a HEAVIER load, with less pressure, in the slower twist rifles and this extra velocity seems to take care of the heavier bullet; at least this is what I have found in my own testing. I sure would welcome a further discussion along these lines from some of your qualified readers.

Next we have this little matter of the re-bored barrels. I wonder if Mr. Wright would give your readers a report on the results he obtains when he finally has his re-bored barrels fitted and chambered. I am still waiting for a re-bored barrel to be returned from Ackley. I note well that Mr. Wright saw some rough rusted castings left out in the weather for proper seasoning or curing. I believe I mentioned this process in my letter on that subject. If by any chance Mr. Shilen of Dryden, N. Y. should see this pile of rusted iron he might inquire, Cured of what? One might ask Mr. Shilen, of what does one cure a HAM?

Now we come to my caustic remarks in regard to this matter of light weight magnum hunting rifles shooting minute

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of angle groups. If Mr. Wright can go out any time and shoot minute of angle groups HE is the exception that proves the rule. But again, it might be that some of us have far different ideas of the number of shots necessary to show the accuracy in a rifle. Years ago when I was teaching Sam Clark in the why and where-fore of accurate shooting, my idea was to have him place NO dependence on only a few shots, fired under ideal conditions. My rule was to fire several TEN SHOT GROUPS, and then REPEAT the process. Sam soon caught on, with the result that he has without a doubt fired MORE SHOTS in simply testing than the average shooter has ever seen. Some of the boys wlil agree that Sam has done well.

Guess, Phil, you will remember that I showed you a THREE shot group that I fired at 200 yards that went into one hole, together with the proper backing target, when you were here recently. This was fired a few years ago on the Johnstown range when we were checking the backing target. If I were to claim this as a three shot 200 yard World Record it would be nonsense, as it was luck pure and simple. Guess I have told you before that a blind hog will find an acorn, now and then. If Crawf Hollidge asks you about this target you might tell him it was fired from a rifle chambered for the .219 Don. case. What else???

If my remarks have been caustic in regard to lightweight magnum rifles, it has been with good reason. I have seen too many of these shooters sit down and fire a three shot group that might be close to an inch. But after firing these three shots they would jump up from the bench and wave the target around as if it had never been done before. Love nor money could NEVER induce one of these riflemen to go back to the bench and then sit down and fire another group.

One swallow does not make a summer, nor does it make more than a TASTE in your mouth, so if some of these three or five shot riflemen want to tell us they get minute of angle accuracy, it is O. K. with me. I would like to see this little matter discussed by other qualified shooters. Guess this wraps up matters for this time.

Sincerely,

Harve

"TINKERING NEATLY DONE"

Spent some of the winter refurbishing my old Parker, a friend of about 40 years. In rebluing the barrels I was faced with the problem of whether to plug the barrels during the degreasing by boiling in a lye solution. Being of a naturally lazy nature and particularly because I had never had a case of rusting of polished steel so degreased, I dunked the unplugged barrels in, gave them a good rolling boil for about 15 minutes, then into a tank of boiling soft water (I think this helps prevent chemical action by a strong alkali) and wiped dry. In spite of the original apparent beautiful appearance of the barrels which had always been well brushed and oiled, I was amazed at the soot, corruption and lead on the patch. And the barrels never looked prettier.

I wouldn't expect one of our fine bench barrels to need this treatment but wonder if it would work on some of the rougher commercial barrels which may have metal fouling. Wish I had one to try.

During a series of efforts in the construction of a set of bullet making dies the most difficult problem was to get that beautiful, mirror slick finish characteristic of B&A dies. Needless to say the results with some of the rough early products were pretty weird. Sectioning showed a gradual thickening of the jacket from tip to base. Obviously, as the jacket and core is forced into the forming die, resistance due to friction accumulates to produce maximum compression on the cylindrical portion of the jacket at the base of the bullet. With the smoothest surface we can produce, this thickening is so slight that it can not be seen on a sectioned bullet and would be difficult or impossible to measure with tools available to the average bullet maker. As we are to have some of this thickening the problem is to keep it to a minimum and uniform, which leads up to the point of this squib; lubrication.

An indirect measurement of thickening should be a measurement of overall length and sure enough, experiments with various kinds and quantities of lubricants as well as ram speeds showed that bullet lengths could be easily controlled over a range of .015". Again it is obvious that the longest bullets should be the best and perhaps this is the measurement we should add to the others we use in our efforts to get perfect bullets. I have had no opportunity to try bullets so made but do hope others will test and report, as one man's tests are far from conclusive. Maybe this has been mentioned before but I read a lot and have not seen or heard of it.

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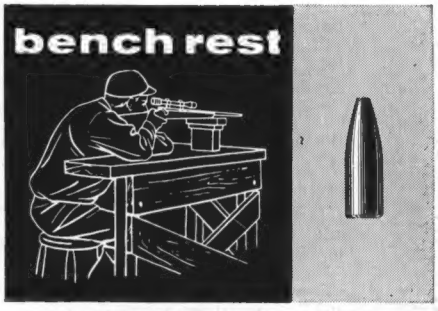

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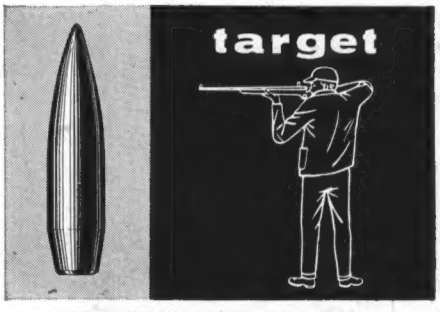

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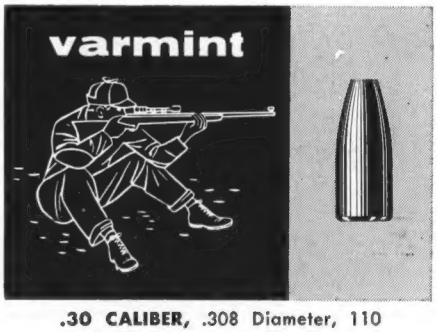

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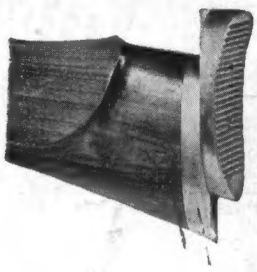

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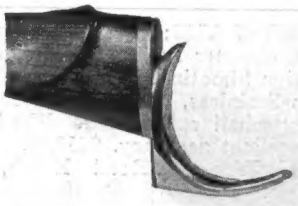

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